THE VETERINARY JOURNAL

AND

Annals of Comparative Pathology.

SEPTEMBER, 1896.

## ESSAY ON VIVISECTION.*

BY MR. W. D. SIMPSON.

(*Continued from page* 9.)

THE next great discoveries were the processes of respiration. The Ancients believed that the air passed through the lung into the cavity of the chest, thence to pass on into the heart, where it mingled with the blood. Imagine any doctor trying to treat a consumptive patient, on the supposition that the lungs let the air through into the cavity which contains them! From such ignorance of facts and all the consequent blundering in practice, experiment alone has delivered us. Then were the various incorrect theories on digestion, brain and nervous system, of which I have not time to speak, though I may say that our present knowledge of them is due to experiment. Those who defend the physiological experiment as an absolute necessity to medicine do so not because this or that drug has been discovered by its means, this or that operation perfected through its practice. They defend it because without it medicine is based upon ignorance; they defend it because it is the foundation upon which physiology as a science stands. If physiology be deprived of this necessary foundation, it will be degraded through no fault of its disciples. It will not fall to pieces, because that which has been won cannot be taken away, but it will be unable to encroach any further upon the morass of human ignorance, because forbidden to lay a firm footing for its advancing tread. From this last chapter we have learnt the value of experiment on living animals, because they show the part that it has taken in building up—and therefore the part that it is likely to take in perfecting—the science of physiology. But the matter is

* Read before the Edinburgh Veterinary Medical Society.

not at all so simple when we come to state the relation of practical medicine to experiment. Here, experiment is only one out of many factors which have combined to produce a certain result; and if anyone chooses to believe that the result would have been produced equally well without experiment, it is impossible to convince him. The fact remains, that it was attained with it. It is true in physiological discoveries other processes are used besides experimentation, but it is comparatively easy to assign to each its distinct share. Under this heading about experiments on living animals in relation to practical medicine, it would not seem strange, if nothing positive could be said except that whatever increased physiological knowledge must improve medical practice. If this were all, it would not be a confession of defeat. Suppose that no astronomer were to be allowed to use a sextant, until he could quote some discovery made by its means alone! or that all thermometers were to be banished from laboratories, unless it could be shown, that whatever we know about heat had been learnt from thermometers and nothing else! So with experiment in medicine. It is not the sole instrument of discovery, nor perhaps the most important; but it is an extremely useful instrument, and in its own place indispensable. In order to appreciate our privileges, let us compare some of the olden with our modern operations. Take firstly amputation. In the old operation to staunch the flux of blood, the masters thought themselves singularly well appointed, when they were furnished "with various stores of hot irons and caustic applications, which they used as they thought meet. And of such as were burnt, the part scarce ever recovered, and that with much ado, for that combust wounds with difficulty come to cicatrization, for by this burning are caused cruel pains, whence a fever, convulsion, and ofttimes other results worse than these. Add hereunto, that when the eschar (scale) fell away, ofttimes a new hæmorrhage ensued, for standing whereof they were forced to use other caustic and burning instruments, through which occasion the bones were laid bare, whence many were forced, for the remainder of their wretched life, to carry about an ulcer upon the part which was dismembered; which also took away the opportunity of fitting or putting to an artificial leg or arm, instead of that which was taken off." What are the differences between this hideous description and the processes of modern amputation? Often an anæsthetic is given; the next step is to empty the limb of blood by the application of the

elastic bandage: after the cutting is accomplished, the injured arteries are firmly ligatured, which causes the deposit of a clot of solid matter, acting as a stopper. The amputation is performed without any loss of blood, or certainly without the least danger of hæmorrhage. Deaths from this cause—once the surgeon's terror—are now almost unheard of. The wound kept perfectly clean, and free from all causes of irritation by the aseptic method, heals naturally and healthily, with very little pain.

Secondly: Is the application of ligatures. Up to the beginning of the last century the nerves used commonly to be tied in with the vessels, causing much suffering and sometimes death from tetanus. Again, the ligatures used were wide, and were loosely tied over corks, etc., so as not to injure the coats of the artery; but these failed to give the proper result. Now the artery is tied extremely lightly, and, as the operator is familiar with the action of the absorbent vessels, he uses a catgut ligature, which will not need to be taken off when the wound is healing, but can be left alone to be gradually absorbed. Imagine the annoyance of the old ligatures, to have three or four different strings hanging out of one wound for months, as occurred in the case of Lord Nelson.

Tenotomy has only been carried on, in a scientific way and with successful results, since the subcutaneous method of performing the operation was perfected. As to tumours, situated out of reach of the knife, or where the hæmorrhage when the were removed could not be arrested, little could be done for the patient till the invention of the écraseur, which was used experimentally upon the lower animals before our human hospital patients. Many other quotable cases can be traced and stated to experiments on animals.

Another way in which experiments upon living creatures have contributed to improvements in treatment is by the testing of various drugs, whose effects are tried upon the lower animals in order to judge of their probable value or uselessness to man. It is quite true that positive conclusions cannot be drawn in this way. All drugs do not affect animals alike with men. Rabbits can eat belladonna, and be none the worse for it; so can goats browse on tobacco and feel no ill effects, but these are exceptions: in short the effect of a drug upon one of the lower animals furnishes a strong presumption—though not an infallible indication—of what its effect will be upon a human being. And in such a hazardous proceeding as that of introducing a

new substance into the complex human economy, it is surely necessary that there should be at least a strong presumption that it will do good and not harm. But this could never be gained without experiment; physiologists try to decrease what they cannot destroy, and to alleviate where they cannot heal. And those who wish to narrow the means at their command for doing so, by totally prohibiting experiments on living animals, had better be quite sure that they know what the state of things is which they propose to alter; for the state of the Law seems to be now to make a fresh regulation now and then, when it occurs to them, or when somebody makes a fuss, that it is necessary to do something. In this way, a state of things has come about, in which it is penal to use domestic animals in any way cruelly, but in which any one may torture wild creatures in whatever fashion he likes—provided it be not for scientific purposes; while any invertebrate animal is given up to whatever anyone chooses to inflict, for any or no reason. The older Law against cruelty to animals, commonly known as Martin's Act, applies only to those called domestic. It did not therefore need the Act of 1876 to protect horses, asses and mules, dogs and cats, from cruelty; while now that it has been passed, an otter may be killed by inches to amuse a crowd of men, but if there be a serious scientific reason for giving pain to a rat the operator is a criminal, unless he is shielded by a fence of licences and certificates. Thus, Mary Ann, the housemaid, may kill all the mice in the house with the horrible poison of phosphorus, and no one will interfere with her; but if Mary Ann's master, a surgeon, injects snake poison into one of them in hopes of discovering an antidote for it, he becomes liable to a £50 fine. And if Mary Ann being tenderhearted, and disliking smells behind the wainscotting, has recourse to live traps, and is then puzzled to know how to dispose of her prey; she may give it to the stable boy to amuse his terrier with, but she must not give it to the surgeon to experiment on. Nothing makes it criminal to give pain to a wild animal, except having a sufficient justification. Briefly, the case stands thus: You must have a good reason for hurting a tame creature; you must not have a good reason for hurting a wild creature; and you need have no reason at all for hurting an invertebrate creature. The R.S.P.C.A. exists for the purpose of protecting domestic animals from any act of cruelty; but we find it later on proposing legislation for the purpose of restricting experiment. In vain we look for the prosecutions. After all,

detections and vigour are not all that is needed for an action at law; there must also be something to be detected.

In conclusion, then, the business of a physiologist is to study physiology. In the course of that study he may find himself obliged to give pain; that is a disagreeable accident of his profession, not its characteristic, still less its essence; but it is clear that the abolition of experiments on living animals would be simply disastrous to the advance of physiology, medicine, and surgery, and thus would greatly hinder the diminution of suffering—both human and animal. "It may be as well to state that every advance made in physiology, pharmacology, and other branches of medicine benefits animals as well as man." Mr. Fleming, M.R.C.V.S., says: "The contagious and infectious disorders are those which have ever been most destructive and intractable. Some of these are special to the human race, others to one or more species of animals, and many of these affecting the lower creatures can be conveyed to man—as rabies, glanders, anthrax, foot and mouth disease, and probably tuberculosis and diphtheria. There are also the parasitic diseases of animals, several of which may be transmitted to ourselves—as trichinosis, and those due to the various kinds of worms and vegetable parasites. The agents in the transmission of contagious diseases are minute organisms. They are endowed with most marvellous powers of multiplication which enable them to act with deadly energy in a very short space of time. Their discovery as lethal agencies was only, could only be, determined by means of experiments on living animals." Inoculation had to be made to test the potency of the cultivated germs, and to ascertain to what extent their diminished energy was compatible with the existence of the inoculated creature, and with its immunity from the original disease. Experiments were absolutely necessary in order to arrive at conclusions, and the result has been the greatest discovery of this century. "By experiments in pathology, disease and mortality have been vastly diminished, and continued experiments in the same direction will cause further diminution. If mankind benefits, so do animals." I have now little more to say, except that it is a truth which cannot be gainsaid that the mortality from disease has been perceptibly decreasing for many years past, and that in many instances disease itself is of a much less virulent type than formerly. Causes must have been long at work to produce these effects, and vivisection claims her share in this good work. Increase of

morality has also been an important factor in diminishing disease. As education advanced, and the people ceased to be plunged in the lowest depths of superstitious ignorance, new ideas, higher aspirations, and a better appreciation of humanity arose. But some persons need to be once more reminded that it is no true humanity which is willing to perpetuate a great mass of obscure misery in order to spare itself the recollection of a few cases of suffering, the details of which it exaggerates and dwells upon with an ignorant and morbid sensationalism. This subject, therefore, must be commended to the dispassionate consideration of all who can place truth above feeling, still more above prejudice, and who will try to correct the assertion made by the opponents of experiment, viz., that in inquiring into the causes which have tended to diminish disease, they may exclude vivisection, on the ground that nothing immoral can produce any permanent good.

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## ESSAY ON RHEUMATISM AND RHEUMATOID ARTHRITIS.*

BY SIR VISTO.

MR. CHAIRMAN AND GENTLEMEN,—The subject of my essay on "Rheumatism and Rheumatoid Arthritis," is, I consider, of great importance both to the veterinarian and stockowner alike, and until late years has baffled the skill of one and has been a source of immense loss to the other.

### *Definition (of Rheumatism).*

A specific febrile disturbance, probably owing its origin to a morbid inbred or constitutional state of the system—often in conjunction with climatic influences and characterised by the manipulation of pain—and a special tendency to the involvement of certain structures such as "coverings of muscles," tendons and joints, these local manifestations being of a metastatic character (Robertson).

*History.*—The term rheumatism is one of the oldest medical terms, as it may be found in the writings of ancient authors, from the time of Hippocrates downwards, it being then, though, simply employed as a synonym of "Catarrh," and was not used in the present sense until the seventeenth century. Previous to that time the disease *now known* as rheumatism included various articular affections—under the

* Read before the Edinburgh Veterinary Medical Society, January 24th, 1896.

comprehensive name of arthritis—although the characteristics of acute articular rheumatism did not escape the observation of some of the old observers.

Boillon, a French physician (1616), was the first to employ the term rheumatism in its present sense. Sydenham was the first to describe the metastatic tendency of rheumatism and also the constitutional disturbances accompanying it.

In 1797, mention is made (in Baillié's "Morbid Anatomy") of enlargement of the heart, caused by rheumatism, an observation confirmed a few years later by Haygarth—the last named observer also mentions inflammation of the joints and of the muscles (but less so) as symptoms peculiar to the disease. A few years later Scudamore (1827). quotes examples of endocarditis and pericarditis as sequelæ of acute rheumatism, and shortly after the introduction of the thermometer into clinical practice was the discovery of a remarkable amount of thermal disturbance, a fact which eventually led to the various lines of treatment.

### *Province of Rheumatism.*

It is a delicate task to define the actual province of true rheumatism, but our best way to do this would be to take acute articular rheumatism as our type, and reject as rheumatic any morbid condition which does not conform to the true nature of the disease.

In attempting to do this we must exclude many forms of arthritis such as are developed as manifestations of other distinct disorders. For example, secondary septic infection, a condition not rarely (in some parts) seen as the result of the retention of cleansings in a cow. Garrod says that no form of arthritis can lay claim to rheumatism unless it be attended by some of the visceral lesions, and that although arthritis and endocarditis may arise from other causes than the rheumatic, yet, when they appear in association or in succession, their rheumatic origin is hardly open to doubt. Evidence from the result of treatment is not necessarily conclusive, but it is only since the introduction of the Salicylic compounds that such evidence is forthcoming.

Chief characteristics of the disease are—

(1) Rarity of suppuration ;
(2) Occurrence of cardiac complication and other tissue changes ;
(3) A natural predisposing diathesis.

From the above we may conclude that the disease is constitutional.

The question of inflammatory lesions has created a great deal of discussion, some observers saying that the rheumatic inflammation is of a distinct type, while others say it is of a mild transitory character, and in its frequent termination in resolution with no suppuration, thereby differing from ordinary inflammation.

Fernet sums up thus:—That in ordinary inflammation both vascular and parenchymatous changes take place, and shows that in rheumatic lesions the vascular changes take place far more conspicuously than the parenchymatous. The serous exudate is sometimes marked, but the tissue elements are, as a rule, unaltered, and on this account we do not find in these cases either solid particles or pus.

When the Hyperæmia comes to an end, or is determined to a fresh seat, the effused serum becomes rapidly absorbed, and there remains in the joint no trace of the morbid process. Such is not always the case, for sometimes a serious change is produced in the part attacked, with the result that it (the part) may be irretrievably damaged.

*Pathology.*

Many attempts have been made to determine the exact nature of *Materies Morbi Rheumatici*, and the theories expounded by pathologists are numerous and diverse, not one of which has as yet been universally accepted. As space and time will not allow me in an essay like this to give the various theories in detail, therefore I shall simply enumerate them, but will give a brief outline of the one which I believe is most generally accepted by the veterinary profession.

The theories are, viz. (1), The Lactic Acid Theory; (2), Nervous — infective—malarial—hyperinosis—neuro-chemical and Cullen's theories.

The Lactic Acid Theory was first originated by Proutt and Todd, who said that rheumatism was due to a chemical poison circulating in the blood, and the poison they endeavoured to prove was lactic acid—a substance produced in muscle in a state of activity. This acid is supposed to be in part oxidised into $CO^2$ and $H^2O$, which is excreted by the lungs, and in part excreted by the skin, but under conditions unfavourable to this oxidation, such as a chill to a larger "surface area" of the skin, with consequent arrest of the secretion of sweat, and, as a result, elimination of acid from the system is interfered with. This superabundance of lactic acid in the system explains the acidity of sweat and urine in rheumatic fever.

The profuse perspiration sometimes seen in acute rheumatism is, no doubt, an effort of nature to get rid of the poison from the system.

This acid in the system is found combined with the lactate of soda, under which condition it, of course, would not affect the blood, which, as is well known, is not acid during life. The lactate has been found in the urine and sweat by Favre. Fuller was of opinion it was formed throughout the attack and not in bulk at the commencement, which fact would account for the "acute febrile symptoms," a thing of common occurrence.

Dr. Richardson's experiments (1853) are undoubtedly favourable to this theory, for the details of which I would refer gentlemen to "Williams' Medicine." These experiments, at a later period, were performed by Ranchin.

The power of producing arthritis by lactic acid when introduced into the system, was accidentally proved by Sir W. Foster, who administered the drug to a diabetic patient (who had never suffered from rheumatism). The patient, after taking the drug, complained of flying pains in the joints, a condition which ceased on stopping the use of the drug, but reappeared when the drug was again administered. The arguments given in favour of this theory are, I think, very strong, and I believe favourably received by many eminent veterinary surgeons.

### *Ætiology.*

(1.) Influences controlling prevalence of disease.

(2.) Predisposing and exciting causes of individual attack.

(1.) Rheumatism exhibits different degrees of prevalence; what determines these variations is uncertain. They would include influences sanitary, dietetic, malnutrition, sudden alterations of temperature, etc. Some observers deny these influences, but admit that if the Rheumatoid diathesis be present, they will then lead to an earlier manifestation of the disease. It is well known that rapid changes of temperature are more liable to cause a chill than extreme cold, and it might be supposed that the controlling influence would be a period of fluctuations of temperature. Young animals can withstand a great amount of cold, but a damp lair, accompanied by cold winds, is undoubtedly a great source of rheumatic disease amongst them. The animal continues to lie; the circulation becomes flagged, and should the slightest constitutional tendency exist, they soon succumb to the disease. But besides meteorological influences, there are

other and more potent causes at work concerning which little is known.

It has not yet been determined what is the specific indwelling factor of the disease, but if we compare phenomena occurring with other strange appearances, it is very evident that a something, viz., the "diathesis" so called, is present in the animal system, and we know that several influences combine to form an attack of rheumatism. Some animals succumb because they have inherited this diathesis, whilst others, as has just been stated, from continual exposure to moisture, cold winds, etc. Others, again, owing to their state of health, fall an easy prey to any acute disease.

ii. Over fatigue in some cases has been thought to be an exciting cause, and, again, local injuries are said to be in some cases exciting causes. From what has just been said, I think we can with safety conclude that in some cases, at any rate, the rheumatic lesions are determined by external influences. The stages most commonly recognised are—(1) acute, (2) sub-acute, and (3) chronic rheumatism, and to either of these the different structures of the body are referred. Associated with rheumatism we have many other diseases, such as influenza, pink-eye, and rheumatism following injuries, sprains, etc.

Lumbago and other forms of myalgia are regarded by some authors as varieties of true rheumatism.

### *I. True Acute Rheumatism.*

*Symptoms of Acute Rheumatism.*—The more characteristic symptoms are preceded often by a deranged condition of the alimentary canal, with an irregular and acrid condition of the fæces. In some animals it is ushered in by rigors and shivering, stiffness of the neck, and gradual increasing animal sweats—which have a peculiar acrid odour, and, according to some eminent observers, abnormally acid—dilated nostrils, anxious countenance, respiration hurried, the majority, if not all normal functions interfered with, general stiffness of the animal when made to move. In many cases, previous to or at the same time as these local manifestations, you find the usual febrile symptoms, elevation of temperature—which in many cases is very high indeed, from 105 to 108 even has been recorded—mucous membrane injected, a frequent, full, unyielding pulse, great thirst, while the urine is of the true febrile type, small in amount, and of a high specific gravity. Besides these common febrile symptoms, you have the cardiac affections, which, however, in some cases are so slight as to

escape observation. In some cases the pleuræ are affected, constituting pleuro-dynia. The hyperpyrexia, so common in man, is of far rarer occurrence in the lower animals.

The local symptoms are the most attractive in consequence of its severity and suddenness. Manipulation of the affected limb will invariably satisfy us as to the nature of the affection; one or more joints are very painful, and may (but not always) be tense, swollen and painful, with often the synovial capsule distended with fluid. The joints most commonly affected are the stifle, hip, hock, shoulder, and knee. The swellings shift from joint to joint, in some instances remarkably quick, this shifting character being eminently characteristic. The muscles themselves are sometimes the seat of great pain and tenderness; there is no suppuration, and the local manifestations are very erratic.

The "fever" of acute rheumatism, whether it is a primary phenomenon or secondary to the local manifestations, is of great importance, and has excited a great deal of discussion.

Fuller inclines to the first opinion, in favour of which he brings forward the following facts, viz, (1) that a rise in temperature may precede the local manifestations; (2) that the elevation of temperature is out of proportion to these local manifestations; (3) that the elevation of temperature may remain after the joints have regained their normal condition.

The blood has an increased amount of fibrin, as evidenced by the buffy coat when it (the blood) is withdrawn, and Besnier says there was marked diminution of red blood corpuscles, with increase of white.

### *Post-mortem Appearance.*

Endocarditis and pericarditis are the most frequent visceral lesions. The cardiac lesions vary in proportion to the extent and severity of the symptoms before death.

When the cardiac inflammation has been very severe, the changes in the heart structures are very marked, especially in connection with the pericardium and endocardium. The exudation of lymph (organised) is laid out in a reticulate manner, and occasionally adhesions of the parietal and visceral layers, and very often a large amount of reddish fluid containing flakes of lymph is found in the pericardial sac. In advanced cases we find the exudation of plastic lymph, is deposited in layers on the pericardium, which presents a shaggy appearance, said to be due to increased activity of the heart. Endocarditis is a much more common lesion than pericarditis, and is seldom of any but rheumatic origin. It

may commence at any time in the course of the fever. The entire lining of the heart is seldom affected, but is limited to those portions supported by fibrous tissues, and which are brought into contact by the action of the organ. When the inflammatory process is prolonged, you may have considerable fibrinous deposits on the valves of the heart, which are invariably better marked on the left side. These excrescences are always well distinguished from the valves on which they are found. Thus we see that rheumatic endocarditis may be said to be the starting point of valvular disease. As this disease is most fatal in its early stages, it is the softer tissues we find chiefly affected. The harder structures, if the animal dies at the early stage, are very often not affected. The surrounding structures of joints, tendons, ligaments, etc., are often found adherent with the connective and subcutaneous tissues, due to the extension of the inflammatory process. In more advanced cases we find the cartilages are ulcerated—expansion of bone tissue—eburnation and anchylosis being the ultimate result. In the case of the hock, you may find the cartilage of the astragalus removed and the porcellaneous deposit taking its place, in this particular case, it is grooved. The muscles are often hyperæmic, with effusion into the underlying tissues. The serous membranes may become attacked, and, according to some observers, the pleurisy is left-sided.

### *II. Subacute Rheumatism.*

This may occur as a primary disease, or it may be the sequel to an acute attack. The symptoms in this case are not so pronounced, and the duration of the disease is much shorter, often lasting only a few days. Briefly speaking, this form is simply a milder type of the acute.

### *III. Chronic Rheumatism.*

This may follow as a sequence to the acute, or it may be met with as an independent and idiopathic disease. In this form the local lesions are not so well marked. The pain is less severe, but more fixed. There is little, if any, fever. It is not so metastatic in character, is less disposed to attack the structures of the heart, but less inclined to yield to curative measures. There may be thickening of the synovial membranes and cartilages and in advanced cases, not only do we find the white fibrous structures attacked, but also the bones and various other parts of the body undergo pathological changes. Tumours or bony excrescences are some-

times found on the bones of the pelvis, spinal column and synovial fringes. As a result of the eburnation and anchylosis afore-mentioned, the animal may become permanently lame. Several cases that I have observed exhibited great pain and lameness, but swelling of the affected joint was by no means an invariable accompaniment.

*Muscular and Tendinous Rheumatism.*

The muscles, with their fibrous tissue investments, are sometimes the seat of great pain, aggravated by movement, and believed to be a sub-acute rheumatism. The animal may evince sudden lameness, a condition which often occurs in agricultural districts. The animals are worked, say, on a damp, cold day, and are allowed to stand in a heated condition on some exposed situation, and, as a result, it is found when they again move they are found to be suddenly lame. The cause may apply, more or less, to all draught horses under these circumstances.

Sometimes the muscles of the loins or gluteals are affected, or, may be, those of the shoulder. The seat of pain is readily demonstrated by passing the fingers firmly over the loin or other place affected. This form does not exhibit, in an ordinary sense, much, if any constitutional symptoms; but if the disease is referable to a large muscular area the symptoms, not seldom, are well marked. The animal appears uncomfortable, with, perhaps, a certain amount of fever. The horse does not feed, pulse harder and quicker than normal, injected conjunctivæ, foul smell about the mouth. It appears to be more or less cramped, and on being moved has a straggling gait. When other parts are affected the symptoms are somewhat similar, and exhibited by special movement.

*Treatment.*—There are various remedies advocated for the treatment of this disease, and it is no easy matter to estimate the absolute relative value of the different lines of treatment recommended. I will briefly give the chief methods of treating this disease, and allow the gentlemen here this evening to discuss their relative merits.

Whatever be the line of treatment adopted the following rules should be considered:—(1) remove the cause, if possible; (2) antiphlogistic measures should be resorted to without delay; (3) administer anodynes to relieve pain; (4) place your patient under the most favourable circumstances.

Under the last rule, rest should be ensured for the animal, one reason, among others, being to expose the animal to as little excitement as possible, in case the heart should be

affected, and in those cases where the latter is weak, alcohol or digitalis may be prescribed.

(1) *The Expectant Method*, as recommended by Sir William Gull, means warmth, good nursing, and rest, with small doses of opium to complete the effect, and to do without any other medical treatment.

(2) *Bleeding* in this disease, as in many others, has its advocates even at the present time, but here the temporary relief produced is no gain whatever when the severity of symptoms coincident with reaction is taken into account, and also taking into consideration the increase there would be in the anæmic condition which, as is well known, is a prevalent sequel to the disease. Therefore, any treatment that is adopted at the expense of convalescence should not be recommended.

(3) *Blisters* were first employed in France by a physician named Dechelly, and in this country by Dr. Herbert Davies, who says they have a constitutional as well as a local effect, inasmuch as they have a tendency to eliminate the "rheumatic poison" from the system in the blister serum. He recommended acetum lyttæ well painted in zones around the joints near to the inflamed part, but not on it. Principal Williams, however, says it is quite as effectual if placed right on the inflamed part.

In those cases where there is a large surface to be blistered, care should be taken, for there is a certain amount of risk from absorption of the irritant, and, as Senator says, a liability to produce strangury cystitis, or hæmaturia. The arguments brought forward by Dr. Davies in favour of this method are (1) that if adopted early and before there are any symptoms of pericarditis and endocarditis, it saves the heart in a great number of cases from any inflammatory mischief; (2) Relief to the local pain is rapidly and permanently obtained; (3) Temperature falls quickly, pulse is diminished in frequency, altered reaction of urine; (4) Convalescence early established, as shown by the return of appetite. Dr. Davies holds that in the neighbourhood of joints the poison is abundant, and if a fairly large area be blistered, you remove the major part of this poison at one stroke.

*Drug Treatment.*—Many drugs have been brought before the notice of the profession from time to time. Some medicines are presented on theoretical grounds, some empirically, but since the introduction of the salicylic compounds, the majority, if not all, are foregone in favour of the more recent production, the salicylic compounds.

In some cases the old method of treatment is recommended as an adjunct to the salicylates.

Calomel in ancient times held a prominent position, and was largely used in conjunction with opium in heart complications.

Tartar Emetic.—This drug was also used at one time, but Mr. Fuller says that this drug of itself was insufficient for the fulfilment of a safe and speedy cure. It no doubt ameliorates (in large doses) the inflammation, but in such doses it is not easily borne.

Perchloride of Iron has a valuable influence in checking rapidly spreading inflammatory process, and has proved beneficial in some cases.

Aconite (alcoholic extract) was recommended by Lombard.

Cinchona Bark.—Recommended by Haygarth. Its action, says Lehert, is due to its quasi-narcotic action on the nervous system.

The alkalies, prior to the salicylates, was the line of treatment most universally accepted. It produced, according to Fuller, a restoration of the alkalinity of the system, assisted in maintaining the solubility of the fibrin, and thus preventing a deposition on the valves of the heart; sedative to the heart and arteries, and also aiding in tissue metamorphosis and excretion of urine, thus assisting in the elimination of the *materies morbi* from the system. These alkaline salts are best administered as the bicarbonate or nitrate of potassium, the latter for preference in 2-4 dram doses, according to the age of the animal, the lesser quantity in the case of foals. When the thirst is great, the nitrate is easily given in the drinking water. If there be constipation present, it is perhaps better to give a slight laxative. A mild saline purge is recommended by some, and an essential thing is that the hygienic arrangements are all looked to, rest, good nursing, and warmth. If the more active symptoms are not relieved in three or four days, Robertson recommends alternately with the alkalies a little colchicum and acetate of ammonia.

*Salicylates.*—The greatest advance yet made in the treatment of rheumatism is the introduction of the salicylic drugs. Attention was first called to these by Buss, in Switzerland, 1875, and in this country by Dr. Maclagan, who was led to give salicin by his belief in the malarial nature of the disease, on the idea that just as cinchona is found growing in aguish districts, so is the willow found in rheumatic districts. The infusion of the willow is an ancient and well-known treatment for rheumatism amongst the Hottentots.

Salicin, salicylic acid, salicylate of soda, salicylate of quinine, and antipyrin are the favourite preparations used at the present day, but the salicylate of soda is, I believe, the one used most universally. One thing in favour of this drug is that it is easier dissolved than the others, and is said to prevent vegetations forming on the valves of the heart; but salicin is less liable to produce toxic symptoms.

One remarkable feature of the salicylates is their antipyretic action in all febrile diseases, but is even more pronounced in the disease under discussion.

After administering the drug the temperature usually falls in three or four days to the normal, and closely following this, in favourable cases, you get cessation of pain.

It has been stated by some authors that when the salicylates are discontinued, relapses are liable to occur. Still, this may be said to be the case after any line of treatment.

*Modes of Action.*—Bristowe and Senator are of opinion that the salicylates are anti-rheumatic, which is supported by Maclagan, who also believes they are not so much antipyretic because the fall of temperature is attendant upon the removal of local symptoms, and holds they are anti-rheumatic, inasmuch as he believes they destroy the *materies morbi rheumatici*. It is, perhaps, interesting to note here that the majority of drugs beneficial in the treatment of this disease are antiseptic.

There is one great objection brought forward by some observers to Maclagan's theory, viz., that although the salicylates possess a great power in the arthritis of rheumatism, yet they have not the comparable influence in diminishing cardiac lesions, and thus if the drug can control the morbid process in one place, why does it not do so in another, *e.g.*, the heart as well as the joints?

Latham says that the power the salicylates have in controlling the disease is owing to the fact that they check the formation of uric and lactic acids in the system.

A very interesting case was recorded in the *Veterinarian* for last November, where several animals were suffering from rheumatism, some of which were placed under the alkaline method, others were placed under the salicylic treatment. Despite the fact that the animals were in other respects under exactly the same circumstances, those treated under the latter method made an earlier and more complete recovery.

Before concluding, I beg to say that while seeing practice with Mr. Harry Olver, of Tamworth, I had the opportunity of seeing several cases treated by the salicylate of soda, which terminated successfully. The salicylate of soda was

given in two-drachm doses twice daily, all other conditions, such as hygiene, warmth, nursing, etc., as I have before stated in my essay, being attended to.

The local treatment consists for the first place, in the early stages avoiding stimulating liniments, apply continuously some cooling lotion as lead and arnica, or the acetate of lead and sulphate of zinc, 4 drams of each to 12 ounces of water; where possible swathe parts well with woollen bandages kept damp. If there be excessive pain order fomentations to the part, and apply a liniment of belladonna, opium, or aconite. If these local symptoms are not diminished in, say, the first week after attack, we must have recourse to something stronger. Liniments (stimulating) should now be applied, or if there be the least sign of it becoming chronic a smart blister to the affected joint or joints, say of cantharides, or a mixture of the latter in equal parts with the biniodide of mercury. This should be done at the discretion of the practitioner. In the case of the ox the same general treatment is recommended, but if alkalies are prescribed they should be given in larger doses. The bowels should be acted upon by a saline purgative, the sulphate of magnesia, say, and in this case as well as with the horse good nursing is essential.

### *Rheumatoid Arthritis.*

In the case of this disease there is no reason to doubt its antiquity, for evidence of its existence many years ago is obtained not only from description, but also from the impression left on bones of victims that have suffered from the disease.

Sydenham mentions the clinical features of rheumatic arthritis. Haygarth differentiates the disease from rheumatism and is supported by the majority of English and German authors. Although the disease bears certain resemblances to the last-named, it is a distinct disease to rheumatism. All cases of *rheumatic arthritis* are alike in one respect only, viz., the character of changes of which the joints are the seat. In all there is a fibrillation and erosion of cartilage, but clinically the group includes several distinct disorders. There is reason for believing that the articular lesions are the sole, or almost sole, manifestations of the disease. And the features of the rheumatoid arthritis are only explained by supposing that characteristic joint lesions are *not* manifestations of a septemic disease, but rather a disturbance of the nutrition of the joints, such as may be due to many causes, constitutional or local (Garrod).

The constitutional, according to Dr. Adams, may be produced by sudden exposure to cold when the animal's body is over-heated, or may result as a sequel to acute rheumatism; the local from habitual over-exertion of a particular joint or from an accident.

In many cases rheumatoid arthritis appears as a primary and generalised disease, attacking many joints, especially the peripheral ones, in a very symmetrical manner. In this form it has many of the characters of a systemic malady, and distinguishable from rheumatism by the absence of any definite visceral lesions. The influence of heredity is much less clearly understood than in rheumatism.

*Symptoms.*—One of the first symptoms observed is a peculiar rigidity of the affected joint, and when first moved it emits a crackling sound; enlargements of one or more joints, which are painful to the touch. Sometimes a local sweating confined to a limited area. The rigidity of the limbs and pain is considerable sometimes when an animal attempts to move. A spasmodic uplifting of the limbs, and especially the hind ones, is often observed. True anchylosis is very rare; but rigidity of the limb is not of unusual occurrence. Synovial bursæ near the affected joint become distended, formed into cysts, the fluid, as the disease advances, may become absorbed, and the sac may be converted into a solid tumour.

*Morbid Anatomy.*

Senator says the changes are partly inflammatory and partly degenerative. Effusion of fluid into the synovial capsules and occasional heat of the joints; vivid injections of the synovial membranes, which point to the element of inflammatory lesions, while the degenerative changes are clearly exhibited in the articular cartilages and bones.

Garrod believes that the "fibrillation" of cartilage is a primary event, and holds that the inflammatory changes are secondary. In synovial membrane and capsule of joints the cartilage suffers at an early period of the disease, and it has a soft and velvety appearance, due to the breaking up of the ground substance into fibrillæ, whilst the cells are removed, and around the edge of the cartilage lipping is observed. When the articular cartilages are removed their places are taken by an ivory-like enamel—the porcellaneous deposit—and, in the case of the hip and shoulder joints, the opposing surfaces of the bones become as smooth as ivory balls.

*Pathology.*—As regards this part of the subject very little is known.

*The Blood.*—Urine and perspiration have been examined, but with negative results, and yet the morbid anatomy is so very characteristic, that no bone or joint in the body is exempt from the attack. The theory supported by Hutchinson is that this disease is the combined result of rheumatic and gouty processes (in man).

The theory supported by Remak is that it is due to defective nutrition. Then, again, is the Dystrophic theory, concerning which there are many adverse opinions; but all agree that that the disease is analagous, but less intense, than the arthritis of locomotor ataxia.

*Treatment* of this disease is very unsatisfactory, and, as a rule, palliative. The lines of treatment should be such as conduce to the improvement of general nutrition.

We have no specific as yet that can entirely undo the mischief that has been wrought in the joints. They may remain large, and although not completely restored to the normal, may not occasion further trouble. Arsenic has been largely used since advocated by Jenkinson, and may be given in combination with other treatment. Garrod and Fuller recommend the iodide of iron, quinine and nux vomica adjuncts. If an obvious provoking cause be present, treatment should be resorted thereto. The regular action of the bowels should be encouraged by giving a slight laxative, the animal being carefully fed, and sometimes may be placed to some slow work. This, of course, is left to the discretion of the veterinarian. When any sudden lameness denotes a fresh attack, fomentations and moderate blisters are very useful. If the pain in the joints be excessive, a large amount of benefit may be derived from the application of belladonna liniment, or this and tinc. of iodine mixed.

Principal Williams, in conjunction with the general lines of treatment already mentioned, advocates the use of alkalies, especially the potash. There are some cases where treatment appears to be of no avail in checking the progress of the disease, which, in pursuing its destructive course, ultimately renders the animal a cripple. Such cases tend to enforce the lesson that a disease having such results should be combated at its early commencement. Thanking you, Mr. Chairman and Gentlemen, for your kind attention.

## CONDITIONS UNDER WHICH BACTERIA LIVE.

BY C. M. A.

THE functions performed by bacteria in the terrestrial economy are now recognised to be of such enormous importance that any information with regard to the conditions under which they live and which influence their development possesses the very highest interest. In this article we purpose to draw our readers' atttention to a very brief epitome of the result of recent researches on this subject. It is of the very highest importance that we should understand these conditions, so that, armed with this information, in the case of those of the disease-producing class, or those whose action is otherwise of an inimical nature, we may be in the position of knowing how to destroy them, or render their development impossible; while, in the case of those which carry on useful work, we may know how their growth may best be fostered.

The most important conditions influencing microbic life are food, moisture, and heat; and, so far, these tiny forms resemble the larger forms of life. They feed directly on organic matter, from which they derive their carbon, in the form of highly complex compounds, differing in this respect from the higher plants, but resembling fungi. Recently, however, it has been discovered that there are certain forms which are found in the soil, and whose functions are of great importance in agriculture, which can actually derive their carbon from purely mineral sources, a function which was supposed to be alone possessed by green-leaved plants. Most bacteria, however, require as food carbonaceous and nitrogenous, as well as other substances of a mineral nature, such as potash, phosphates, etc. Some live as parasites, *i.e.*, on living organisms. Such, as a general rule, exercise an injurious action, as is seen in the case of disease germs; though this is not always the case, as with those infesting the roots of certain kinds of plants. The majority, however, can only live upon dead organic matter, and such are generally useful in their action. It is fortunate that the latter class are much more abundant than the former. But this general distinction does not by any means cover all the differences in their food proclivities. Many minor differences exist; and the existence of such a divergence in tastes has been taken advantage of in the past in effecting the separation of one kind from another. Some require for their development the presence of air, while some are able to develop in the absence of air, a difference which led Pasteur to divide them into

*aerobies* and *anaerobies*, viz., those which required oxygen and those which did not. Moisture is also necessary, although its absence does not always prove fatal. Heat is another very important condition, and, it may be added, is the great factor used by man for regulating the development of micro-organic life; since it is, as a rule, the most easily controlled of all conditions. For most micro-organisms the temperature they delight in is that of a swelteringly hot summer's day, or about 90 degs. Fahr. A temperature some 50 degs. higher than this is able to kill most of them. But this does not refer to their spores. Indeed, it is quite amazing what some of these hardy microbic infants can endure in the shape of heat. A few have been actually proved capable of resisting, for a short time, a dry heat of nearly 100 degs. above the boiling point of water. Very low temperatures of cold likewise check their development; but here the hardy spore emerges from the ordeal of the lowest temperatures which science has been able to artificially produce, temperatures several hundred degrees below the freezing point of water, and sufficiently low to freeze the atmospheric air to a solid mass—apparently unscathed, and with its vitality in no way impaired. While most minute organisms are only able to flourish within a comparatively small range of temperature—from about 50 degs. to 120 Fahr.—yet it may be added, as an interesting example of the power they possess of adapting themselves to altered conditions, that certain of them, by careful acclimatisation, have been accustomed to withstand—and even to develop at—extreme temperatures. Thus, certain bacteria, which inhabit the soil, can flourish at temperatures as high as 150 Fahr.; while, on the other hand, certain bacilli can develop at freezing point.

But perhaps of all their characteristics none is more astounding than the enormous rate at which they are capable of increasing. It has been calculated that most of them are able to reproduce themselves in one hour's time. Of course, the rate at which this increase takes place will largely depend on how far the conditions of growth are favourable. One of the most important of these is, as we have just seen, temperature; and as illustrating this, it may be mentioned that while germ life may increase at ordinary temperatures, in six hours' time, five hundredfold, at the temperature of tepid water, and within the same period of time, the rate is increased four thousandfold. Under the most favourable conditions it has been calculated by Dr. Cohn that the number of microbes developed from a single germ may, in the course of twenty-

four hours' time, amount to 16 millions, in two days to 28½ billions, in three days to over 47 trillions, a number which would weigh some 7,500 tons; while in five days the number expressing them would consist of 37 figures, and the volume they would occupy would be equal to that of the entire ocean. It may be well to add, lest the nervous reader should not unnaturally be alarmed by the above statement, that such a rate of development is only possible when all conditions are favourable, a state of matters not likely ever to exist. For one thing, the supply of food necessary to permit of an increase, on such a colossal scale, of our minute neighbours is awanting. As affording a practical illustration of the truth of these statements with regard to the rate at which micro-organisms develop, when plenty of food is supplied and other conditions are favourable, may be cited the manufacture of yeast, the ferment of which, although 160 times greater in size and weight than bacteria, are yet excessively minute. In twenty-four hours, according to Dr. Cohn, a single yeast ferment may give rise to no less than five tons of yeast. It is their well-nigh universal distribution, and the wonderful capacity they possess for mustering their forces in untold myriads, that alone explains the enormous importance of the *rôle* they perform in the economy of nature.

And here it may be well to point out the very important fact, which has only recently been discovered, of the destructive effect of light on micro-organisms. There can be no doubt that among the many and incalculably great services performed by the sun, is to be numbered the fact that we are not altogether obliterated from the face of the earth by the ubiquitous germ. Myriads of microbes are killed by the sun's rays; and while many may not be actually killed, their properties are considerably modified. This has been found to be the case with certain disease germs, the malignant properties of which are considerably modified, if not, indeed, destroyed, by exposure to the sun's rays. Recent investigations have shown that the destructive action of sunlight is due to the violet and ultraviolet rays of the solar spectrum. The electric arc, which is rich in violet rays, also exercises a destructive effect, and, it may be interesting to add, the Rontgen's rays likewise possess a destructive action. It has further been shown that the mode in which this destructive action is affected is due to the production of peroxide of hydrogen, which, as is well known, is a strong oxidising agent. Those micro-organisms which survive the action of sunlight owe their immunity to the possession of a protective

coloured skin, which effects the absorption of the violet rays. It is highly probable that most disease-producing germs are destroyed by sunlight. We know, at any rate, that this is the case with regard to those producing anthrax, typhus, and probably cholera. In exemplification of the destructive action of sunlight on the development of bacteria in media exposed to its action, it may be mentioned that in the surface water of the Thames the number of microbes present were decreased by about fifty per cent. through four and a half hours' exposure to the sun. It will thus be seen that the purifying effect of sunlight is great, and that we should, therefore, take every means in our power to take advantage of its aid in cleansing our dwelling houses and our city streets, by flooding them with sunlight. The whole question of the modification of the characteristic properties of germ life is a highly interesting one. So far, such modification has more especially been brought to our knowledge in connection with disease germs; yet it seems not unwarrantable to suppose that an alteration in the conditions of their life would have a corresponding effect on the properties and action of other kinds of microbes.

Some reference may be here made to the methods in use for carrying on investigations as to the presence and number of bacteria in different substances; a matter which, while exciting the wonder of the public, naturally appeals to their curiosity. How is it possible, they exclaim, to count 20,000 organisms in a drop of water; and certainly the subject seems at first sight truly wonderful, and it is easy to understand that much and elaborate research should have been spent in perfecting methods for accomplishing this difficult feat.

In the earlier years of the science, the methods adopted for the purpose of isolating the different organisms from one another for the purpose of studying their nature, was that based on the principle already referred to, of their different food predilections; and this was the method adopted by Pasteur in many of his researches. It was, however, not always suited to effect the object aimed at, inasmuch as the difference between bacteria in this respect are not sufficiently great always to ensure complete isolation. Another method subsequently introduced, consisted in removing the organisms which vegetated most luxuriantly in any medium, to another vessel, where they were cultivated, and treating the culture thus obtained in the same way. This treatment being several times repeated, successive cultures were thus made, the one from the other, until a pure culture was ultimately obtained:

and the dilution method, a method based on the same principle, is still employed for obtaining pure cultures. A considerable advance was made when heat was utilised as a separating agent. In this way spore-bearing bacteria were readily separated from others.

But all these methods, while they helped to effect the separation of the different micro-organisms from one another, and thus to advance our knowledge of their nature and characteristics, did not furnish us with the means of estimating their number in any substance, or even of obtaining reliable results in the matter of their isolation; and there can be no doubt that the progress of bacteriology was considerably delayed on this account. At length, however, the problem was solved by the great German, Dr. Robert Koch, who introduced what is known as the "gelatine method"—a method which, for the first time, rendered the quantitative determination of micro-organic life in different substances possible, and provided the investigator, at the same time, with a reliable method of isolating different forms. This process consists in cultivating the organisms in specially prepared gelatine, containing suitable food ingredients, and previously sterilised, that is, rendered free from germ life. The substances containing the micro-organisms are introduced into such gelatine when in a liquid state, and are thus uniformly distributed throughout it. The gelatine is then allowed to solidify, and is kept at a suitable temperature, while care is taken to protect it from external contamination. In this way the micro-organisms develop under most favourable conditions, and being in a fixed medium, the progeny of each is prevented from moving away from the parent microbe. The result is, that in the course of a short time we have, in place of every single organism, a large number. To such a family, which may number hundreds of thousands, the term "colony" has been applied. They present the appearance of patches of different sizes. The idea of cultivating organisms in this way was suggested to Dr. Koch some 15 years ago by the examination of patches which grew on a slice of potato, when exposed to the air. A minute examination of these patches revealed the fact that they were made up of pure cultures of different microbes. Thanks to Koch's method, much advance in our knowledge of the nature and functions of many organisms has been made. An interesting fact, which we have already referred to, in this way elucidated, is the considerable modification which may take place in their characteristics, when cultivated under different conditions. Thus, for example,

with regard to certain pathogenic germs, it has been found that when they are cultivated for some time outside the living body, their virulence is very much diminished.

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## THE SPAYING OF COWS IN ITALY. LAPAROTOMY *VERSUS* THE VAGINAL METHOD.

DR. N. LANZILLOTTI-BUONSANTI, principal of the Royal Veterinary College of Milan, contributes a paper on this subject to *La Clinica Veterinaria*, of which we give a translation as follows:—

In the course of the scholastic session just closed, extending from November to June, ten cows have been spayed in our clinic, all quite successfully. Some of these will be shown at the Cattle Show to be held in Milan next December. We are quite confident that our farmers and breeders will eventually be convinced of the economic utility of this operation and will have it performed on a much larger scale when they come to understand it more thoroughly. We shall have occasion to return to this question of spaying when we are able to give full details, at present being collected from stock-owners, as to increase of weight, rapidity of fattening, production of milk, etc. Each cow operated on by us was carefully weighed when it entered our clinic and before undergoing the operation. At present we confine ourselves to brief accounts of the operation as performed on four animals.

First Case. Light red-coloured cow of Swiss breed, 13 hands high, 10 years old; operation by vaginal method 26th November; removal of ovaries with écraseur. Ovaries slightly hypertrophied and with cysts. Temperature never above 102° Fahr. The cow left our clinic on 14th December with the vaginal wound completely cicatrised.

Second Case. Light bay cow of common breed, 12¼ hands high, 16 years old, bought by the Directors of the College for the purpose of demonstrating to the students more closely the time taken by both methods of spaying. She came to our clinic on 13th April. On 21st April we removed with the écraseur, by the laparotomy process successfully performed, the left ovary; this was of normal size but had two cysts. Abdominal incision closed in layers, that is, first of the peritoneum, then of the muscles and then of the skin in the upper half; in the lower half there was a suture of the peritoneum and a suture in the muscular layers and of the skin. The stitches were removed on the 21st May. Com-

plete typical cicatrisation by first intention; no interference with the general health of the animal subsequentiy to operation. On the 4th May the right ovary was removed by the vaginal method. The seventeen fourth-year students were allowed to thrust their right arms, carefully disinfected, through the vaginal incision, in order to gain information as to the position of the ovary. This, greatly atrophied, was brought down into the vagina and, while the ligature was being applied to the broad ligament, became enucleated. A slight increase of temperature was noticed on the 12th May. The cow was re-sold to the butcher from whom it had been obtained.

Third Case. Red-coloured cow of Swiss breed, 13¾ hands high, 10 years old, weighing 10 cwt. 74 lbs., came to our clinic on 25th April. Operation by laparotomy on 28th April. The ovaries became enucleated whilst being brought in the direction of the incision in order to be removed with the écraseur. They presented no apparent injury. Suture of the peritoneum and also in mass of the muscular layers and skin. Recovery regular, general conditions excellent, temperature normal. Removal of the stitches on 8th May. The cow was taken away on the 19th May. The owner stated some time afterwards that in the lower part of the incision he observed a fluctuating subcutaneous swelling, which he opened and emptied of the pus which it contained. The cavity cicatrised rapidly without any bad consequences. Probably the silk with which the last three stitches of the suture had been made was not thoroughly disinfected as the remainder had been.

Fourth Case. Dark-red-coloured cow of Swiss breed, 13½ hands high, 9 years old, weighing 9 cwt. 39 lbs., was brought to our clinic on 9th May. Laparotomy on the 12th. The ovaries, normal in size and appearance, were removed with an écraseur. Suture of the peritoneum, muscular layers and skin; while the suture was being made hemorrhage of the circumflexed iliac artery appeared, the artery not having been tied, but only closed with a Péan. Recovery in due course. Cicatrisation by first intention. The stitches were removed on 20th May, and the cow was taken away on the 23rd. The owner wrote to us, under date 6th June, that a stitch had suppurated slightly, but was soon cured; further, that the milk production was already on the increase, although the cow had not yet recovered her full appetite.

(Dr. Lanzillotti-Buonsanti promises further details, which we shall have pleasure in presenting to our readers as soon as they appear).

## EXPERIMENTS ON LIVING ANIMALS.

A RETURN has been presented to Parliament showing the number of experiments performed on living animals during the year 1895, under licences granted under the Act 39 and 40 Vict., c. 77. The total number of persons holding licences was 213, but, of these, 65 performed no experiments. Tables are given which afford evidence (1) that the licences and certificates have been granted and allowed only upon the recommendations of persons of high scientific standing; (2) that the licensees are persons who, by their training and education, are fitted to undertake experimental work and to profit by it; and (3) that all experimental work has been conducted in suitable places. The total number of experiments performed in 1895 was 4679. Of these there were performed, under license alone, 1,333; under certificate A, 2,317; under certificate A+E, 36; under certificate B, 603; under certificate B+EE, 154; under certificate C, 227; under certificate F+A, 5; under certificate F+B, 4; total, 4,679. In experiments performed under the licence alone, or under certificate C, the animal suffers no pain, because complete anæsthesia is maintained from before the commencement of the experiment until the animal is killed. Experiments performed under certificate A (or E or F linked with A) are practically always of the nature of hypodermic injections or inoculations. In experiments performed under certificate B (or EE or F linked with B) the animal is anæsthetised during the operation, but is allowed to recover. These operations, in order to ensure success, are necessarily done with as much care as are similar operations upon the human subject, and, the wounds being dressed antiseptically, no pain results during the healing process. The large number of inoculation experiments under A is to a great extent attributable to investigations connected with the production of diphtheria-antitoxins and analogous bodies. More than half of the experiments under B have been inoculations made (under anæsthetics upon rodents) with the object of diagnosing rabies, the public having largely acted upon the advice printed upon the back of dog licences, which is to the following effect:—"If a dog suspected of being rabid is killed after it has bitten any person or animal, a veterinary surgeon should be requested to forward the spinal cord to the Brown Institution, Wandsworth Road (or some other licensed institution), in order that it may be ascertained with certainty whether the animal was suffering from rabies."

## SWINE FEVER.

AT last, we have much pleasure in reporting, the Board of Agriculture compelled, there is no doubt, by the disastrous failure to stamp out this disease that has resulted from their amateurish efforts, has decided to adopt the advice of the veterinary profession. The delay in doing so has caused a loss to the nation of an enormous amount of money, and in large proportion of the swine slaughtered by their orders—about 145,000—the annual figures being in 1893, 6,997; in 1894, 46,278; in 1895, 34,574; and in 34 weeks of 1896, 55,379. To this is to be added, the cost of the useless machinery employed to carry out their wretched policy. We admit the difficult nature of the work the Board has had in hand, but consider that these figures prove those responsible to have erred in judgment:—

"SUSPECTED ZONES" OF SWINE FEVER.—An order by the Board of Agriculture is published in last night's *Gazette* instituting the Swine Fever (Suspected) Order of 1896. The principal enactment is in the following terms:—"No swine shall be moved into any market, fair-ground, sale-yard, or place of exhibition in a suspected zone unless they are accompanied by a declaration of the owner of the swine, or of his agent authorised in writing for this purpose, to the effect:—(*a*) That the swine so moved have been on the premises, from which they have been so moved, for a period of at least twenty-eight days, immediately before such movement, and that no other pig has been brought on to those premises within such period; and (*b*) that the swine are not affected with swine fever, and have not during the period of twenty-eight days as aforesaid, been in any way exposed to the infection of swine fever; and (*c*) that the swine are not moved out of a swine fever infected place, and that the movement is not prohibited by notice of an inspector of local authority or of the Board given under any order of the Board." There are also regulations respecting markets, fairs, sales, and exhibitions of swine in a suspected zone, and these include the following:—"(1) Notwithstanding any regulation made by a local authority under any order of the Board, no market, fair, sale, or exhibition of swine, in this order referred to as a sale, shall be held in a suspected zone except as expressly authorised by this order; (2) a sale may be held in a suspected zone with a licence of the local authority of the district in which the same is to be held, but in the case of a sale to be held in a market, fair ground, or sale-yard, or an exhibition, only on condition that the person to whom the licence is granted will not permit any pig to be moved into the market, fair-ground, or sale-yard, or place of exhibition, as the case may be, in contravention of the preceding article." Further regulations relate to the movement of swine out of a suspected zone, movement of swine landed from Ireland through a suspected zone, instituting the local authority as the authority to enforce the order, penalties for offences, etc. The order comes into operation on the 1st prox. A further order by the Board of Agriculture revokes "The Markets and Fairs (Swine Fever) Order of 1894." A third order declares certain districts in the county of Essex, in the county of the Isle of Ely, and in the county of Norfolk, to be "suspected zones."

## *TUBERCULOSIS IN THE HORSE.

It was long thought that the horse was not subject to tuberculosis; but this is not the case. The horse may become tuberculous, and during the last fifteen years or so a great number of cases have been mentioned in which this diagnosis has been confirmed by the observation of a specific bacillus. Probably a hundred such cases have been reported, but, after all, the truth remains that tuberculosis in the horse is still very rare. It is a remarkable circumstance that all the known cases have remained isolated, even when the patient formed part of a large stud. This may be owing to either of two causes. On the one hand, the tuberculous horse, becoming rapidly incapable of active service, has been slaughtered early in order to avoid useless expense; on the other hand—and this is the more likely cause—the lesions have been located in the digestive organs; the lungs are involved more slowly, and the animal is nearly always sacrificed before the pulmonary lesions have had time to undergo the softening process, which would have rendered them so dangerous to the neighbouring animals.

The observations that have been made of tuberculosis in the horse, so far as these are known, differ widely. They may be divided into two distinct groups: in the one group, which seems also the larger of the two, it appears that infection is produced through the digestive organs; the lymphatic, mesenteric and sub-lumbar ganglions are hypertrophied and indurated or softened; the spleen is enormous and filled with voluminous whitish tumours of varying consistency; the intestinal mucous membrane is often full of ulcerations, situated principally on the Peyer patches (plaques) or the closed follicles. When the lungs are invaded the lesions are manifestly fresh, and consist of a diffuse infiltration of the interlobular conjunctive tissue, without apparent tubercles, without cavities, without foci of mollities. This it is which explains the absence of cough, of discharge, and of expectoration, and the non-transmission of the disease to the neighbours of the patient. In all the cases of this type which I have observed (in all, since 1878, they are 14), I have always noted at an advanced stage of the disease very abundant urination (polyuria) lasting for several weeks; finally, on eight occasions, it has been possible for me to make the clinical diagnosis of the disease by taking as my basis the general condition of the subject, the polyuria, and the ascertainment,

*A contribution to the *Recueil Vétérinaire*, by M. Ed. Nocard.

by rectal exploration, of enormous hypertrophy of the sub-lumbar ganglions. From the bacteriological point of view, this abdominal form of tuberculosis in the horse is characterized by the extreme abundance of the Koch bacilli which the lesions contain, and by the great length of these bacilli.

In the second group of cases the tuberculosis seems to have begun with the lungs; at any rate, the lungs and the bronchial ganglions are the parts most severely attacked. The appearance of the pulmonary lesions varies considerably; sometimes we have a case of genuine acute miliary tuberculosis, sometimes the parenchyma is, so to speak, crowded with little abscesses having a fibrous shell and imprisoning caseous pus very rich in bacilli; sometimes we might almost fancy we had to deal with a neoplasia of sarcomatous appearance, which has become generalised in the lung; the section of these tumours is homogeneous, white, firm, without foci of mollities, without fibrous envelope in the periphery. Nothing, at first sight, suggests a tuberculous lesion; the study of the sections alone permits us to make the diagnosis of the lesion by showing it to be formed of a mass of tuberculous follicles, very rich in giant cells, but, on the other hand, very poor in Koch bacilli.

In these two forms tuberculosis of the horse is inoculable, and produces in the guinea-pig and rabbit characteristic lesions; still, I have several times noticed in the guinea-pig lesions clearly tuberculous but somewhat different from those which we observe after the inoculation of tuberculous products taken from the human subject or from the cow; whilst the ganglions were hypertrophied and softened, whilst there was effusion in the peritoneum and the pleura, the spleen was healthy or only slightly hypertrophied and softened, and showed no tuberculous lesions. For a long time I attached no importance to these differences in the result of inoculation with tuberculous products from bovine or human subjects, and with those from the horse; now I think I can give the explanation.

In 1891 I presented to the Congress for the study of tuberculosis some cultivations of tuberculous bacilli taken from the horse and from the pig; these cultivations had absolutely the same appearance as those of human origin, and behaved in exactly the same way with regard to the different cultivation-media or the different subjects of experiment. These three types of tuberculous bacilli have been carefully preserved since then, they have always maintained the same character, and they have served, each kind

equally well, for the production of all the tuberculin that has been used in France since 1891.

I had obtained the equine cultivation by sowing directly on tubes of glycerinised serum the caseous pus taken pure from large encysted nodules in the lung of a horse slaughtered that very morning; the animal had been in good condition, and there was nothing before the *post-mortem* to lead anyone to suspect the existence of the lesions with which the lung was filled; the pus, when sown, was very rich in Koch bacilli. A strange thing was that two of the fifteen tubes sown gave me straight away abundant and vigorous cultivations; generally the matter has to pass through the guinea-pig or rabbit before we obtain cultivations, and most frequently we arrive at these only after several passages.

With regard to swine cultivations, it is only after the seventeenth passage through the rabbit that I have succeeded in obtaining my first cultivation; the bacillus had acquired such virulence that the rabbit succumbed to a genuine tuberculous septicæmia fifteen to eighteen days after the intravenous inoculation. As touching the particular point of view which occupies us to-day, I wish to emphasise only one peculiarity: that first cultivation of mine derived from the horse—so thoroughly like the human cultivations—*came from a case of tuberculosis having its seat in the lungs.*

During the past month or two I have had occasion to study parts taken from horses that had been affected with abdominal tuberculosis; all the indications were in accordance with those I have already described—progressive emaciation, extreme weakness, intense polyuria, considerable hypertrophy of the spleen and of the mesenteric ganglions, the ganglionary pulp extremely rich in specific bacilli of great length. I took advantage of the opportunity to inoculate some guinea-pigs and rabbits, and to sow a great number of glycerinised potatoes, which I covered with a thick layer of ganglionary juice; once more I had the good luck to obtain *at the outset* a cultivation on a single one of the sown tubes; it was vigorous and abundant, and enabled me to produce a great many others on the most diverse media. Now, the startling thing was that these new cultivations all had the characteristics *of those of aviary origin;* instead of being dry, warty, difficult to separate—as are those of human origin—they were thick, soft, fat, easily spread out on all kinds of media. In addition to this, the way in which the bacillus behaves in the various animals used for experiment allows us to range it much

closer to the bird bacillus than the human bacillus. The following experiments will give a good idea of what I mean; On the 11th March, with a slight dilution of a third cultivation, I inoculated (*a*) a guinea-pig weighing 1 lb. av. under the skin of the thigh; (*b*) a Russian rabbit weighing a little over 3 lb. av. by intravenous injection; (*c*) a common rabbit weighing nearly 4 lb. av. by same process; (*d*) a hen weighing 3 lb. 9 oz. av. by same process. The Russian rabbit dies on 31st March, weighing 2 lb. 8 oz. av.; the second rabbit on 6th April, weighing 3 lb. av.; the hen on 9th April, weighing 1 lb. 14 oz. av. In the two rabbits the lungs are infiltrated with an incredible number of grey or colourless, very minute granulations; the spleen has increased in bulk tenfold, is of a dark red colour, smooth and soft; its pulp is simply a bacillus culture. The liver is pretty firm, of normal bulk; the examination of the juice obtained by scraping the surface of a section shows Koch bacilli in considerable quantity. On the 9th April the guinea-pig, always bright and lively, weighs 17 oz. av. At the point of inoculation there exists a small ulcerous sore; the ganglions of the fold of the flank are hypertrophied and indurated. The animal does not look as if it were going to die, at any rate for a long time. I may state here that two guinea-pigs, inoculated on 5th January with a little pulp taken from the spleen of the first horse succumbed on the 19th and 27th March, with an ulcer at the point of inoculation, from generalised ganglionary tuberculosis and pleural effusion; the spleen was big, red, soft and smooth without any apparent lesion, although the pulp was very rich in bacilli; we know that generally hens resist quite easily inoculation with human bacillus and that, on the other hand, guinea-pigs resist easily the bird-bacillus. That is what has been produced by the new type of bacillus with which I have experimented. It is true the lesions produced by this bacillus are not absolutely identical with those produced by the bird-bacillus, but that is doubtless owing to the modifications undergone by this bacillus from the very fact that its home was in the organism of the horse. In any case it is clear that the bacillus obtained from this case of abdominal tuberculosis of the horse is much more akin to the bacillus of bird-origin than to the bacillus of human origin. My readers will see that there was full justification for the distinction I had set up, in the name of clinical science and of pathological anatomy, between the two great types of equine tuberculosis. This distinction is to-day confirmed by the discovery of the prime agent, that is to say, we find that, whilst the pulmonary

form is closely connected with human tuberculosis, the abdominal form appears due to aviary tuberculosis.

This verification presents yet another point of interest: it shows that if there are mammals which offer great resistance to aviary bacillus—the guinea-pig and especially the dog are of the number—there are others which may, even under natural conditions, contract tuberculosis of aviary origin and succumb to it. Now, if this is true of the horse and the rabbit, who would venture to affirm that it is not so of man? But it is no mere hypothesis; I was able to study several years ago tuberculosis sputa, inoculation with which, whilst rapidly fatal to the rabbit, rarely killed the guinea-pig and produced in it lesions, if not identical, at least very like those due to the aviary bacillus. I have been able to obtain cultures of the bacillus from this source by sowing quantities of pulp taken from the spleen of rabbits dying after intravenous inoculation; these cultures were absolutely identical with those of the bird-bacillus; yet the hens inoculated with these cultures resist for the most part, whether the inoculation has been made under the skin, in the peritoneum or in the veins, but those which succumb present lesions at the *post-mortem* similar to those of the natural disease; here also the passage through the human organism seems to have modified pretty considerably the virulence of the aviary bacillus.

If then man himself may contract aviary tuberculosis—and the thing is at any rate probable—the most elementary prudence demands that we should forbid the sale of poultry coming from a tuberculous poultry-yard. If the owner chooses to make use of such poultry, let him do so; he knows the danger; if he wishes to avoid it he has only to take care that the suspected fowls be thoroughly well cooked for the table. But the purchaser would be exposed, if he were to eat them roasted, to swallowing viscera insufficiently cooked and containing considerable quantities of bacilli still alive and still virulent.

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PRINCIPAL WILLIAMS and his secretary, Mr. Williams, M.B., C.M., arrived at Kingston, Jamaica, on Friday, the 31st of July, and had the honour of dining with the Acting Governor, General Hallowes.

After an interview next morning with the Colonial Secretary they then proceeded to the Parish of St. Ann's to commence the investigation.

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## ANTHRAX IN ARGENTINA.

SEÑOR V. EVEN, editor of *La Revista Veterinaria*, of Buenos Aires, has an interesting article on the subject of anthrax in the May number of his journal, and we give a condensed translation for the benefit of our readers. Señor Even, it is interesting to note, obtained his training at the veterinary school at Alfort, near Paris; he is assisted in the conduct of his *Revista* by, amongst others, three English surgeons, members of the Royal College of Veterinary Surgeons. He writes as follows:—Every year about this time (May) a great many cases of anthrax occur, principally in the wintering-quarters of the west and north. The only region which as yet seems free from the plague is the south in the province of Buenos Aires, except the environs of the Capital and of the city of La Plata. The provinces of Entre Rios, Corrientes, Santa Fé, Córdoba, Santiago, Tucuman and Salta have the disease now in the enzootic state. The ravages caused in the native stock are comparatively small, but they are enormous in the bovine stock imported from Europe or issuing from the breeding establishments of the province of Buenos Aires. Anthrax has existed for many years in this country, and there seems to be no record of its first outbreak, but for the last three or four years it has been making terrible strides. It attacks by preference the finer herds, and fat, well-fed animals, and it shows itself amongst cattle, sheep and horses; the two first-mentioned pay a very heavy tribute to the disease. I cannot say which pays the heavier. Last year a grazier in the north of the province of Buenos Aires, lost in two days, out of a herd of a thousand bullocks, 500 animals. It is worth noting that the majority of cases occur in the first few weeks of spring and of autumn. I have also observed that cases are most numerous in fields where prickly plants exist, such as thistles, the *xanthium spinosum*, and the like. The prickles of these plants play the part of lancets for inoculation with anthrax-spores. With the racial improvement of animals and their greater refinement, the power of resistance on the part of the organism to the action of hurtful or destructive germs seems to diminish; in fact, diseases in animals are produced in the exact ratio of the animals' degree of perfection—one might say to their degree of "civilization."

Anthrax makes most progress in Argentina where the germ has been longest in existence and where no efficacious means have yet been adopted to stop its advance. A strange

fact in this connection has been observed, namely, that the bacteria in passing through fine organisms acquire thereby greater power, On estates where in former years it spared the cattle-pens it now settles down without mercy and decimates the stock. Anthrax is, of course, due to a microbe, the *bacillus anthracis*, and is spread by sporulations, that is to say, it produces innumerable spores or seedlets which are scattered over the fields by the intervention of various agents, notably winds and storms. These spores have wonderful powers of resistance to destruction and preserve for a long time—in certain conditions for years—their vitality and their horrible capacity for reproduction. Spores capable of reproducing the bacillus—the agent of the disease—have been found in land where carcases of animals dying from anthrax had been buried *ten years before*. Amongst all the microbes known to science few show such extraordinary powers of resistance.

It must be remarked, however, that the disease set up by these spores is much more benign among our native cattle than the corresponding disease is in Europe. It seems to have been greatly influenced by our climate or by some other, as yet unknown, circumstance, and to have undergone thereby a certain attenuation or diminution of its virulence ; it may be that this attenuation is owing to the fact that our cattle and sheep live entirely in the open air—a condition very favourable to resisting power. The first surgeons who made scientific observations on this disease in Argentina, Dr. Robert Wernicke and Veterinary-Surgeon C. Lambert, did not fail to notice this attenuation, real or apparent, of the anthrax virus and at first were inclined to look upon Argentina anthrax as a disease distinct from European anthrax which had been so carefully studied and described by Pasteur. They based their opinion, I believe, on the fact that there was a great difference in the symptomatology, the lesions, and the mode of propagation of the disease as exhibited in Europe and in our country. In the year 1887, shortly after my arrival in Argentina, I had an opportunity of observing anthrax in a young Durham bull ; a few hours after its death I was able to examine its blood. I wrote an article at the time, in which I stated that the microbe differed in no way from the European, and that the lesions were the same as those I had observed in the course of my practice in France. I sent specimens to M. Pasteur and he declared after examination that he found a *bacillus anthracis* identical with the European. I rather think that

the later studies of Dr. Wernicke caused him to adopt Pasteur's opinion. It thus seems to me established that the bacillus of Argentina is the same as the European, although its effects on the organism have not been so terrible here.

The great impetus that cattle-breeding has received within the last few years, the division of labour in rural establishments, and the evolution of the various classes of cattle-breeders and dealers, namely, the cabañeros (that is, in Argentina, breeders of pure stock only for reproductive purposes), ordinary breeders for the market, and graziers—all these causes have produced a stir in the cattle-trade absolutely unexpected and unforeseen, and have given rise to frequent interchange of stock. All the means of communication, roads, cattle-trucks—everything has become infected by the constant passage of contaminated herds, and thus the seeds of disease have been scattered far and wide, and anthrax has spread to fields and districts which never knew it before. In addition to all this, the bacillus, which, as I have already said, seemed to have lost part of its vitality in passing repeatedly through the organism of the *native* cattle bred from generation to generation on the same land and leaving it only for the slaughterhouse, has recovered its deadly power in its passage through the blood of imported and refined animals. It is a well-known fact that in the majority of cases the carcases of animals that die of this disease are left lying in the fields, decomposing slowly by the action of air, rain, and sun, and torn to pieces by birds and beasts of prey. Very few in number are the overseers who can tell when an animal has died from anthrax, and who take means to destroy the carcase and disinfect the place. Some of these are afraid of the expense of carrying out the instructions of the authorities and of veterinary surgeons. There are a great many whom it is quite impossible to get to understand that the dead animals have died of anthrax; the erroneous belief has taken firm possession of their minds that in such cases the dead animals must swell rapidly, that one leg always sticks straight up in the air, that the head always lies in a particular direction, and so on, each idea being sillier than the other. It is true that the carcases of victims of anthrax, when they die fat, swell rapidly in spring-time when pasture is tender, and likewise in summer through the action of heat, but in autumn and winter the *post-mortem* swelling does not show itself for a long time; it depends more upon the feeding and the time of year than on the disease itself. My own observations lead me to believe that its importance

as a diagnostic sign has been greatly exaggerated. In the case of animals struck by lightning, and in all diseases which surprise the organism in full functional activity—especially those that are infectious—the production of gases occurs in a few hours; but if death has approached slowly and the disease has taken two or three days to destroy the animal, if the digestive apparatus happens to be half empty, and if the temperature is not very high, the production of gases will proceed slowly, and in some cases no swelling of any importance will be visible.

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## Cases.

### FOUR CASES OF OPEN JOINT.

BY W. H. GILBERT V.S., LEESBURG, OHIO.

I WAS called to see a ten-year-old horse that had fallen down on some small stones that had been put on a road and cut two-thirds across the left knee, through the capsular ligament in one place, the synovial fluid coming out of the wound, the knee swelled, sweating on the shoulders. He was in so much pain that I could not tell anything about his pulse nor respiration. I gave him nitrous ether two ounces, cleansed the wound, put a splint on the back part of the leg, provided a large pad of absorbent cotton, and long roller bandage; then applied equal parts of powdered alumen and amylum on the wound, and covered the pad of cotton with a liberal quantity of the same. Having the pad held against the wound by an assistant, I applied the bandage rather snugly. I removed this carefully every twenty-four hours, for one week, and by this time the synovia had ceased running, when I applied boracic acid three times a day, leaving the bandage off, but keeping the splint bound on the back part of the leg tight enough so that the horse could not bend his knee. He was tied short so that he could not get at it. In two months it was healed over. The owner hauled two loads of corn with him and then turned him out and he got down to roll, but immediately arose, with the same knee torn clear across into the bone. This horse died in four days.

I have treated three horses with open joints since with success, but when not at work I would have stout splints buckled on, and keep them on for five months.

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# Editorial.

## MEAT INSPECTION.

THE necessity for the inspection of animal food by competent men has been forcibly brought home to us by the results of the scientific investigations during the latter decades of the nineteenth century, into the nature and causes of disease, and its transmissibility in various ways and forms from the lower animals to mankind.

The extensive powers entrusted to local self-governments in this country, be they corporations or municipalities, Councils of counties, districts, or parishes, embrace the administration of Public Health Bills, as well as other measures designed to promote the public weal, and with these facts before us, the question arises in our minds, as to the manner in which this important duty of the inspection of meat destined for consumption as animal food is performed by these public bodies. We much regret that a perusal of the return lately supplied to the House of Commons, regarding the system of inspection adopted throughout England and Scotland, leaves us no alternative but to stigmatize it as inefficient, inexcusable, and, in one word, disgraceful.

In London, throughout its districts and parishes, meat is inspected, if at all, by "all sorts and conditions of men," 187 in number, which includes one medical man but no veterinary surgeon. In towns where there are public abattoirs the meat is inspected (?) by butchers and policemen as a rule. Liverpool has the quality of its meat supply regulated by four butchers. Birmingham by two of the same practical class. Manchester has added to its butcher-inspecting staff, two veterinary surgeons. Portsmouth has an inspecting staff who qualified for their important duties by a preliminary training as carpenters and as tram conductors, etc., etc. Glasgow, which city, by a strange coincidence, numbers among its magistrates several gentlemen very largely interested in the cattle trade, is apparently quite satisfied with the inspection of its meat by three butchers and ten policemen. Dundee follows suit, by showing its confidence in the omniscient powers of four gentlemen in blue. Scotland on the whole, however, compares favourably with England, as while there is only one town in England, viz., Manchester, that is reported to employ veterinary surgeons as inspectors, Edinburgh and Greenock show their appreciation of the value of veterinary science by entrusting the inspection of meat

almost wholly to veterinary surgeons. These statistics refer only to our populous centres, and it is, therefore, extremely probable that where no check on the sale of unsound meat exists, there will be found individuals base enough to traffic in it.

To look for any reasonable plea in justification of the existence of so extraordinary a state of matters in this age of scientific knowledge, would be a search in vain.

Can its parallel be found in any country within the boundaries of civilization? We unhesitatingly answer, no. Then, what are the agencies at work that have the effect of boycotting us out of these inspecting appointments; the men who throughout Europe and America are considered to be the best fitted from their special training and opportunities to fill them, and whose services with the view of preventing the distribution of unsound animal food are largely utilised. It would be trivial and and a waste of time, to institute comparisons between ouselves and those individuals, who are admittedly indispensable in their proper spheres of action, but who in this country are inspectors of meat. Economic reasons may explain the existence of this startling anomaly, and a more discreditable plea could not be advanced. The health of the millions should be the first and only consideration, and not the expense to be incurred by the employment of trustworthy and efficient inspectors. Are there any vested interests the disturbance of which is dreaded? This is a delicate point we refrain from discussing, although we fear they may have their influence in bolstering up the wretched system of meat inspection so generally adopted among us.

We are much inclined to the belief that the mischievous example set by the Board of Agriculture to local sanitary authorities, in its harsh treatment of veterinarians, has contributed to this exhibition of supreme indifference to the value of the veterinary science shewn by the latter, in connection with meat and we may also add milk inspection. We have no hesitation in making the remark that a more flagrant example of maladministration than that we lay to their charge, could hardly be cited.

A splendid object lesson as regards the responsibility incurred by those who are entrusted with the conservation of the public health, has been afforded by a legal decision given lately in Birmingham. The particulars are, briefly; the executors of a gentleman whose death was certified to have been caused by blood poisoning from the escape of sewage gas into his residence, entered an action at law against the

local authority of the district, for damages. The sum of £3,500 was awarded, as the sanitary inspector was proved to have been remiss in the performance of his duties.

It is perfectly clear to us that a valuable precedent has been established. A large amount of illness and many deaths are traceable to the consumption of diseased animal food. Much of this food may, and we have no doubt does, escape the notice of inefficient inspectors, for whose work our civic administration who "play such fantastic tricks before high Heaven" are held responsible by the majesty of the law. We hope that among the changes in the whirligig of time we will shortly see all meat inspection in the hands of the veterinary profession, be it the result of legal decisions such as the above, or from a wider and more just appreciation of the value of veterinary science. There can be only the one opinion, that were it on public grounds alone, the whole question should be brought seriously to the notice of Parliament.

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## THE NEW CODE.

AFTER a considerable amount of deliberation the Scottish Veterinary Colleges have come to an agreement on an important point, and that is the abolition of the summer session. In future, therefore, there will be only one session, extending from September or October to April or May, and the student will obtain the full thirty weeks of study at college, with liberty during the whole of summer to see practice. It has been suggested that the session should commence early in September and terminate in April, because, it is said, September is a quiet month with practitioners and April is one of their busiest, as being the month in which most operations are performed, and in which, therefore, assistance is most needed. It is probable that this consideration will weigh with heads of colleges, and that next year—it is too late this year—the session will commence and terminate a month earlier. The advantage of the new arrangement will be that parents and guardians can correctly estimate the cost of education for their sons or wards, and veterinary surgeons will now be able to enter into agreements with students for a semi-pupilage during the first three years that they attend college. Further, students and teachers will be able to map out their work in such a way that, when April or May comes and brings the examinations with it, the students will not be fagged, as they are in July, but will be full of hope and vigour in anticipation of a long summer in

the country; teachers will work, no doubt, at higher pressure, but all the more vigorously and systematically.

Students are like racehorses; they go into general training —at college; then comes the order to get ready for a certain event—the examination; the trainers—the teachers—proceed methodically to increase the work of each pupil, and when the day of trial comes they say of this man or that: He is fit; he has been neither overworked nor underworked; let him run, and let impartial judges decide as to his merit. Of course, just as in the field good horses sometimes fail to do justice to themselves and to their trainers; so, also, in the examination hall good students are rejected by the examiners; but this is part of the chapter of accidents, and must not be held as vitiating the system. On the whole, we anticipate the best results from the new arrangement.

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WE are much pleased to note the progress that the veterinary profession has made in the estimation of our military authorities. The combatant military rank, according to the length of service and merit, granted to veterinary surgeons in the army, followed up by a handsome increase in their retired pay, form an ample acknowledgment of the value placed upon their services. We are the more gratified, as these marks of approval to our military brethren are bound to react beneficially on the profession generally. We congratulate Director-General J. D. Lambert, C.B., on the success of his efforts to improve the position of the army veterinary surgeon.

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A STATE VETERINARY COLLEGE has been established in New York. The following have already been appointed upon the staff:—Director and Professor of Veterinary Medicine, Principles and Practice, Zymotic Diseases and State Medicine, Dr. James Law; Professor of Veterinary and Comparative Pathology and Bacteriology, Dr. V. A. Moore; Assistant Professor of Veterinary and Comparative Physiology, Materia Medica and Pharmacy, Dr. P. A. Fish; Assistant Professor of Veterinary Anatomy and Anatomical Methods, Dr. G. S. Hopkins; Professor of Microscopical Technology, Histology, and Embryology, S. H. Gage; Instructor in Microscopy, Histology, and Embryology, Dr. B. F. Kingsbury; Assistant in Veterinary Bacteriology, Dr. R. C. Reed.

WE are pleased to note that the teaching staff of the State

Veterinary College, recently established in New York, is headed, as Director and Professor of Veterinary Medicine, etc., by Mr. James Law, F.R.C.V.S. He has long held an eminent position in America as a veterinarian and teacher, and is one of the few now amongst us whose *alma mater* was the late talented John Gamgee's short-lived teaching institution in Edinburgh. His diploma dates from April 29th, 1861.

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## Proceedings of the Royal College of Veterinary Surgeons and Veterinary Medical Societies, etc.

### ROYAL COLLEGE OF VETERINARY SURGEONS.

#### Sir F. Fitzwygram's Veterinary Prizes, 1896.

Six competitors entered for these prizes. The *vivâ voce* examination took place at the Royal Horse Infirmary, Woolwich, on 4th August, and three candidates were selected for the further written examination on the following day at Red Lion Square.

The following are marks obtained by the above three candidates :—

| | | | |
|---|---|---|---|
| Full marks—*vivâ voce* examination | .. | 2,080 | Total |
| „ „ written „ | .. | 1,050 | 3,130 |

1st Prize, £50, F. A. Verney, R.V.C., *vivâ voce* 1,935, written 990, total 2,925.

2nd Prize, £30, W. J. Browning, R.V.C., *vivâ voce* 1,680, written 805, total 2,485.

S. E. Morton, Dick College, *vivâ voce* 1,390, written 728, total 2,118, having failed to obtain 60 per cent. marks in two subjects, is disqualified for a prize. The donor has awarded him £10.

The Examiners were Veterinary-Captain Blenkinsop and Mr. Sidney Villar.

The Regulations and questions set were as follows :—

*Regulations.*

Lieut.-Gen. Sir F. Fitzwygram offers his usual Veterinary Prizes to be competed for after the Summer Examination of the R.C.V.S. :—1st Prize £50; 2nd £30; 3rd £20.

The Competition is open to students who have passed both the *vivâ voce* and written examination since June, 1895, and have obtained the diploma R.C.V.S.

The *vivâ voce* examination will take place at the Royal Horse Infirmary, Woolwich, on Tuesday, August 4th, commencing at 10 a.m.

As soon as that examination is over, the examiners will select as many as they think fit for the written competition on the following day, which will be held by kind permission of the President R.C.V.S., at 10, Red Lion Square, W.C., 10 a.m.

The number of competitors is limited to two students from each school, to be selected by the Principal.

Sixty per cent. of marks must be obtained in each subject.

*Vivâ Voce Examination.*

*Clinical Medicine.*—Cattle, 200 marks; sheep, 100; horses, 300.
*Clinical Surgery.*—Cattle, 150 marks; sheep, 50; horses, 300.
*Soundness of Horses and Certificates, etc.*, 350.
*Ageing.*—Cattle, 80 marks; sheep and pigs, 50; horses, 150.
*Diseases of Dogs*, 200 marks.
*Riding for Wind* (optional), 50 marks.
*Selection of Horses for specific purposes*, 150 marks.

*Written Examination.*

*Anatomy*, 250 marks; *Morbid Anatomy and Bacteriology*, 250; *Physiology*, 250; *Medicine and Surgery*, 400. One and a half hours each will be allotted for Anatomy; for Physiology; and for Morbid Anatomy and Bacteriology Medicine and Surgery, two hours.

Four questions on each of the first three subjects; six on the fourth. The questions will be such as will admit of being answered concisely. Attention is directed to this point.

Every question must be answered, or at least attempted to be answered. Any neglect on this point will disqualify.

The donor will pay actual travelling expenses, not exceeding £3 for each Candidate.

Further details as to place, date, hour of commencing examination, etc., can be obtained from the Secretary, R.C.V.S.

The names of Competitors must be sent to Mr. HILL, 10, Red Lion Square, London, W.C., by the 1st of August.

*Medicine and Surgery.*

(Time allowed, two hours. Every question to be attempted).

Question 1. Enumerate the internal parasites of the sheep, state the organs in which each is found, and specify those which at times cause large fatalities in British flocks.

2. How does staphyloma usually arise in the dog? Describe in detail your method of operating for enucleation of the eyeball in a severe case, and what instruments would you require.

3. You are called to assist a cow in parturition; the fœtal membranes are ruptured, and two fœtal feet are visible at the vulva; on manual exploration you find the head and and another foot in the vagina, the whole being wedged. What is the probable condition, and what steps would you take to procure delivery?

4. Describe the pathological condition in scirrhous cord and your method of operating for its removal. What therapeutical agents may be usefully exhibited at an early stage in this affection?

5. What do you understand by contagious pleuro-pneumonia in the horse, and what is the usual duration of this disease in uncomplicated cases?

6. Mention the most important congenital malformation seen in the urinary organs of the domestic animals.

*Physiology.*

(Time allowed, one and a-half hours. Every question to be attempted.)

Question 1. Describe the mechanism of hearing.

2. What tracts of white matter have been observed in the spinal cord, and what is known of their use? Illustrate your answer by means of a diagram.

3. What is the daily waste of the body in a horse during complete repose, and what amount of food is necessary to repair this waste?

4. What is lymph? What theories are put forward to account for its production? In your answer discuss lymphagogues and the mechanism by which the lymph is forced on.

*Morbid Anatomy and Bacteriology.*

(Time allowed, one and a-half hours. Every question to be attempted.)

Question 1. Describe the macroscopic and microscopic changes in the lung of a cow dead from chronic pulmonary tuberculosis, and the means you would adopt to demonstrate the presence of the bacillus of tuberculosis in a microscopic section of the lung.

2. Describe the morphological and cultural characteristics of the tubercle bacillus, and contrast the bacillus of fowl tubercle with the bacillus of tubercle in mammals.

3. To what is tetanus due? In cases of acute traumatic tetanus, where may the bacillus be found? Describe its morphological and cultural characteristics.

4. Describe the macroscopic and microscopic changes in an affected muscle in azoturia.

*Anatomy.*

(Time allowed, one and a-half hours. Every question to be attempted).

Question 1. Give the attachments of the *ligamentum nuchæ* in the horse. Illustrate your answer by means of a diagram.

2. Describe the flexor muscle of the metatarsus of the horse, and compare it with that of the ox.

3. Trace the ulnar nerve in the horse from its origin to the metacarpal region.

4. Compare the pancreas of the horse, ox, sheep, and dog.

ARTHUR WM. HILL,
Hon. Sec.

## SCOTTISH METROPOLITAN VETERINARY MEDICAL SOCIETY.

THE summer gathering of the Scottish Metropolitan Veterinary Medical Society took place on Saturday, 8th August, at Melrose, the town selected for the meeting this year. The Edinburgh contingent travelled by the ten o'clock train to Melrose, where they were joined by other members from the south-east of Scotland and a few from the North of England. The party at once drove to Mertoun, where they were most courteously received by Lord Polwarth, and shown his valuable herd of Shorthorn cattle, which were much admired by the visitors. On returning to Melrose the business meeting of the Society was held in the George and Abbotsford Hotel, Mr. John Cameron, Berwick-on-Tweed, President of the Society, occupying the chair. Among those present were:—J. Hutton, F.R.C.V.S., Kelso; A. Boyd, F.R.C.V.S., Melrose; T. Connochie, M.R.C.V.S., Ayton; T. Connochie, M.R.C.V.S., Galashiels; J. Aitken, jun., M.R.C.V.S., Dalkeith; W. Hepburn, M.R.C.V.S., Coldstream; Geo. Elphick, M.R.C.V.S., Newcastle-on-Tyne; Dr. Jas. Hunter, Edinburgh; Mr. Hunter, Edinburgh; J. Mair, M.R.C.V.S., Lauder; Hy. Thompson, M.R.C.V.S., Aspatria; Professor Geo. Paton, Cirencester; D. Young, Esq., N. B., Agric; W. O. Robertson, M.R.C.V.S., Selkirk; Wm. Kitching, Northumberland; Dr. Gibb, Lauder; W. Owen Williams, F.R.C.V.S., Edinburgh, Peter Moir, M.R.C.V.S., Secretary, and several visitors.

*New Members.*

The CHAIRMAN said he had much pleasure in nominating Mr. James Lindsay, Dumfries, as a member of the Society.

The SECRETARY (Mr. Peter Moir, Edinburgh) seconded the nomination.
Mr. J. AITKEN, Dalkeith, also nominated Mr. W. O. Robertson, Selkirk.
Mr. ANDREW BOYD, Melrose, seconded this nomination.

Mr. Donaldson, Dollar; Mr. W. G. M. Braes, Linlithgow; and Mr. Lothian, Duns, who had been duly nominated at the previous meeting, were unanimously elected members of the Society.

*Amalgamation with the National Association.*

The meeting took up consideration of the suggestion by Professor Macqueen, London, that local veterinary societies should be affiliated to the National Veterinary Association.

The CHAIRMAN explained that a small committee was appointed from among those resident in Edinburgh, as being conveniently associated together to consider this subject.

The SECRETARY (Mr. Peter Moir) said the committee was composed of Professor Bradley, Mr. Rutherford, and himself. The conclusion to which they had come, was as follows:—"The committee, while admitting that the objects of the scheme put forward by Professor Macqueen are very desirable, inasmuch as it is designed to further the interests and uphold the rights of the veterinary profession, is of opinion that it involves the risk of interference with the independent action of the society, and recommends that until the scheme has been more fully considered, the Society should withhold its acceptance of the affiliation with the National Veterinary Association that is offered to it and all the local veterinary societies." It rested with the Society to accept this report or not.

The CHAIRMAN stated that he was not present at the National Veterinary Association's meeting this year, when the subject was discussed there. He hoped some other members would be able to enlighten them on the subject.

Mr. G. ELPHICK, Newcastle, president of the North of England Veterinary Medical Association, stated that his association had taken a somewhat similar view. He believed it had been proposed by the National Veterinary Association to hold a meeting at an early date at some place where it would be convenient for representatives from each veterinary medical association to meet and discuss this question. Some definite proposals would then probably be put forward, but in the meantime the matter remained in abeyance. He believed his own association had deputed the president and secretary to attend the meeting whenever it should be called, and he had no doubt the matter would then be fully threshed out.

Professor W. O. WILLIAMS, Edinburgh, said he wished to sound a note of warning. The intention of Professor Macqueen was to invite all the veterinary medical societies for the defence of the profession. It was an indication that they had no confidence in the Council of the Royal College of Veterinary Surgeons, who were the legal protectors of the profession. The profession annually sent so many members of themselves to the Council, and these members represented the profession on the Council. If the members of the profession desired any grievance to be adjusted they ought to appeal to the Council of the Royal College of Veterinary Surgeons. They ought not to endeavour to raise a new body. If this amalgamation took place the result might be that the societies would become so powerful as to say that they could do without the Royal College or its Council, and perhaps in a few years they would commence to grant diplomas in opposition to the Royal College. There was a danger of permitting these societies to band themselves together for defence purposes, as long as the Royal College was in existence. He sympathised with the movement most sincerely, but he saw many evils in front of them. He moved that they accept the recommendation of the committee.

The CHAIRMAN said the matter might be viewed in the same light as the ratepayers' associations which were established to discuss various municipal concerns, and to concentrate the opinions of the ratepayers and bring weight to bear upon the town councils. He did not think there would be any special danger in the matter. Unity was strength, if directed in the proper way, and perhaps it was not wise to stand aloof. He also pointed out that no definite scheme had yet been proposed, all that they had been asked to do being to assist in framing some scheme.

The SECRETARY explained that the profession now knew more of the proposed scheme than the committee did at the time of their meeting. They knew that the terms of the report did not apply so fitly to the scheme as they did a month ago. Since then the Central Society and the Southern Counties Society had met, and the proceedings at their meetings had made them more enlightened as to the present state of the scheme. The latest information they had gleaned from the meetings of these Societies was that affiliation was not offered. There was simply a request on the part of Professor Macqueen that delegates be sent from each society for the purpose of discussing the whole matter. He suggested that they might follow the example of the other societies, and appoint delegates to attend this proposed conference.

It was agreed, however, to let the matter remain *in statu quo.*

*Veterinary Surgeons as Jurymen.*

A letter was read from the Southern Counties Veterinary Medical Association, stating that at a meeting of the Association, at Southampton on 25th June, it was resolved to again request the Council of the Royal College of Veterinary Surgeons to take steps to obtain by Act of Parliament the exemption of veterinary surgeons from serving upon juries: and also the revision of fees which are now paid to veterinary surgeons when giving evidence in criminal cases, so that they might be placed on a similar footing to solicitors and medical men. The assistance of the society was solicited in removing the injustice from which their profession was suffering.

The SECRETARY stated that a letter to the same effect and from the same Association was forwarded to the Council of the Royal College of Veterinary Surgeons on 2nd April. The Council replied that they could not see their way to do anything in the matter, and recommended an appeal to local Parliamentary representatives. It was an argument in favour of a National Veterinary Society, when the Council treated so common-sense a request in such a manner.

The CHAIRMAN said that, with regard to exemption from serving on juries, his experience was a very pleasant one in that respect, because during all the years he had been in Berwick-on-Tweed they had had the good sense and kindness never to ask him to perform any such duty. He appreciated it very highly, and certainly he did not think that justice had been any the worse because he had not been there. He suggested that, in view of the short time at their disposal, it might be better to delay consideration of the letter.

Professor WILLIAMS thought they might dispose of the matter without any discussion, and, in order to elicit the feeling of the meeting, he moved in accordance with the terms of the suggestions contained in the letter.

Mr. J. AITKEN, Dalkeith, seconded, and it was unanimously agreed to support the Southern Counties Association in their requisition to the Council of the Royal College of Veterinary Surgeons.

*Summer Session for Veterinary Colleges.*

Consideration was then given to the question of a summer session for veterinary colleges.

Mr. ELPHICK said he objected to a summer session, and contended that

they should have only two examinations during the year, one in December and another in April. The Royal College of Veterinary Surgeons should be the best judges of this matter and not the teaching schools. As the bye-law stood at present the teaching schools simply governed the Royal College, with the result that everything was upside down. The summer session was doing a great deal of harm, not only to the profession, but to the students as well. It unsettled the students, and they had no possible chance of seeing any practical work in the country with practitioners. He moved that the members of this society consider the summer session detrimental to the best interests of the profession, and that examinations in December and April would be most convenien.t

The SECRETARY concurred in every word Mr. Elphick had expressed regarding this question of a summer session.

The CHAIRMAN also agreed with what Mr. Elphick had stated.

Professor HUNTER said this was a matter not only of expediency and comfort to the teacher but of benefit to the student, and he could not see that the summer session was of advantage to anyone, particularly the students. The students had frequently expressed their opinion to him on the matter, and all the better class of them seemed to be agreed that the break in the continuity of their studies unsettled them. In the medical profession the system seemed to work better, but this was due to the fact that their summer studies were totally different from the winter studies, the summer work being almost entirely practical. In the veterinary profession, however, the practical work was not to be done in the school at all; it was done throughout the country, and would require a longer time than what was got in the few weeks between the end of the present summer session and the beginning of the present winter session. The day might come when the practical and theoretical work might be mixed up pretty well, but at present the student could really only do one thing well at a time. He could only do the practical work when his theoretical studies were nearly laid aside, and for that reason he would advocate a reversion to the older method of having an unbroken session with two examinations.

After some conversation Mr. Elphick's motion was unanimously adopted.

### *Septicæmia in Cows.*

Mr. ANDREW BOYD, Melrose, read the following paper on "Septicæmia in Cows":—I don't believe in making a long paper if it can be avoided, but simply to give the details in as few words as possible. I have chosen this subject for a short paper, not because I think it is new, but because I think septicæmia in calving cows is far more common than we frequently notice. If a cow loses power and is unable to rise at the time of parturition, milk-fever generally gets the blame. I am of opinion that a great many of the cases called milk-fever are nothing more nor less than septicæmia. I daresay most of you will have seen far more cases of milk-fever in a byre in one season than in another, and if attention were paid to those cases as they go on it would be noticed that the fatality is greater when there are two or more cases in the same byre. Some may be inclined to give the feeding the blame, and in some cases I know feeding is sadly to blame, but I would like to draw your attention to the sanitary condition of the place as well as the feeding. If any of the gentlemen here have made microscopic examinations of the uterus, peritoneum, or blood of cases I have mentioned, I am sure they will agree with me that septicæmia is far more frequent than is at present supposed. It would be qnite superfluous for me to detail the pathology or morbid anatomy of septicæmia, as you all know that. As you are aware septicæmia is due to some septic material getting into the blood, and how the septic matter gets there is easily understood, but where the septic matter comes

from is often difficult to find out. I believe that bad sanitation for a year or two in a building is one of the principal causes of the disease.

Take, for instance, a permanent lambing-shed, where decomposing placentas are allowed to lie about, and where lamb skins are too often seen hanging about; and what is the result? An outbreak of inflammation in ewes, but which is nothing more nor less than septicæmia; but if the stock be removed from the shed and its vicinity the disease ceases. If bacilli of septicæmia are in a byre, from whatever source, they must, of a necessity, be disturbed and sent floating about by the every day work needed in the tending of the stock.

At the time of parturition the generative organs are in a highly favourable state for the reception and cultivation of bacilli. The generative organs are quite open at that time, and exposed to whatever may be floating about, and where could there be better *media* or surrounding circumstances than a uterus and its natural temperature for the cultivation of bacilli? I wish to relate what I may term two outbreaks of the disease. No. 1 outbreak occurred in the premises of a cow-dealer. His premises were composed of three parts. In No. 1 house he kept cows that he bought calved, or some time off their calving. In No. 2 house he kept cows near the calving, and calved them there. In No. 3 house he kept his calves. Between No. 2 and 3 house part of the wall was broken down, leaving an opening 4ft. by 3ft. This dealer had five cows dead before I found out the cause. After I found out the cause other six cows died before I could get the dealer to build up the wall and disinfect the premises, his reason for so refusing being that he wanted the proprietor to do the building; but as soon as the building and disinfecting was done the disease entirely disappeared. For a time I was puzzled as to the cause, but one day I asked what he kept in No. 3 house, and he said the calves. I then asked if he had any illness amongst his calves, and he said, "Yes, as sure as a calf is put in there it will die of navel ill." Now, navel ill is septicæmia, and the cause of so many deaths amongst the cows.

No. 2 outbreak happened in a private byre of cows. The building in which the cows were kept had, shortly before the outbreak, been converted into a byre, which previously had been used for housing cattle. When converted into a byre the floor was cemented to guarantee good sanitation, but the roof was thatch and old, and that is where I say the poison was and, perhaps, is still.

Four or five cows died out of this byre, but not being able to disinfect the thatched roof, I had the cows as they came near calving removed to a clean, well ventilated place, and properly disinfected. The cows were, and still are, kept there till they calve and remain till the generative organs are quite closed. After this had been done no more cases occurred, but I believe if cows were calved in the byre now the disease would re-appear. Thorough examinations, microscopically, were made which showed the disease to be septicæmia. I may also state that the longer the disease went on the cases were the more fatal and virulent. The disease is ushered in with shivering a few hours after calving; the fever gets high and the patient loses power of legs, and, instead of lying on the sternum, the patient will persistently lie on her side with the head thrown back to the extreme, and all efforts to get her on the sternum are futile. The patient cannot lie on the sternum, as she is suffering pain from septic peritonitis. There is a dark fætid discharge from the uterus, with straining.

When I get a case of supposed milk-fever where the animal is inclined to persistently lie on her side, with a temperature higher than is usual in milk-fever, I look upon the case with suspicion, and have the uterus well washed out with a solution of perchloride of mercury and give antiseptics internally, and at once examine as to the sanitation of the premises. If a case occurs in a byre the best plan to adopt, if the premises cannot be properly cleaned and

disinfected, is to remove each cow as she comes to her time to a clean house, and let her remain there till the generative organs are properly closed.

I am more and more convinced every year that bad sanitation, both as regards the byres and their surroundings, is a great cause of disease amongst calving cows. Also, I believe, bad sanitation has more to do with abortion than any other cause. I have not given *post-mortem* appearances, etc., etc., as you all know them. I have given you in as few words as possible what I have experienced and what I believe to be the cause of so many deaths in calving cows. I hope I may provoke a good discussion and get the opinions of gentlemen here who are abler and more experienced than myself.

The CHAIRMAN remarked that Mr. Boyd's paper should have a beneficial effect, if it did nothing else than make them analyse the causes of their cases more than they had done in the past. He was not sure that they would have time to discuss the paper as fully as it deserved to be discussed.

Professor WILLIAMS suggested that they should ask Mr. Boyd to be permitted to adjourn the discussion on the paper until next meeting.

Mr. BOYD: Certainly: with pleasure.

The CHAIRMAN: It will be profitable to adjourn the discussion, because we have not time to discuss the paper with justice.

Mr. HARRY THOMPSON, Aspatria, thought the paper ought to be put in print first, so that all the members of the profession might have an opportunity of reading it. He had no doubt they would have a good discussion at another meeting.

Mr. ELPHICK said he had very great pleasure, as a visitor, in thanking Mr. Boyd for his very interesting paper. It was one that he had no doubt deserved the serious consideration of them all, and no harm would be done in postponing the discussion till next meeting. With their permission, he would like to move a vote of thanks to Mr. Boyd for his very interesting paper.

The vote of thanks was very cordially given.

### *The Honour of Principal Williams.*

The CHAIRMAN, referring to the absence from the gathering of Principal Williams, said they all rejoiced in the honour that had been conferred on their esteemed colleague by the Government of Jamaica in selecting him to carry out the important investigation into cattle disease which he was now entering upon in that island. He was sure they all wished Principal Williams success in the efforts he was making, and it was extremely satisfactory that his great work had been recognised in high quarters in the nation.

### *A Veterinary Sewing Needle.*

The CHAIRMAN exhibited a small contrivance resembling a thimble to be used by veterinary surgeons in connection with the sewing of wounds. He explained that they had already various forceps for assisting them to manipulate the needle in sewing wounds, but he had always had certain objections to them, especially if sewing a wound in a horse when standing, because it was then inclined to jump off in the middle of an operation and pull out the forceps. He always thought that one's forefinger and thumb were the best director; and the only thing needed was a little assistance in pushing the needle through. He exhibited the contrivance and showed a kind of pocket in the thimble into which the needle was placed, the advantage obtained being an increase in the pushing power.

Professor HUNTER said perhaps they were aware that in the old-fashioned cases worn by the army veterinary surgeons, they had thimbles for wearing upon their thumb, but these went out of use. He was afraid that now and again the thimble would slip, and there was considerable danger of the head of the needle entering the hand. He was a little afraid that if an accident

should happen, the hand would come to grief. He had no doubt that the old army surgeons' thimbles went out of use, because of the slipping and the head of the needle, which ran into the surgeon's hand or thumb.

Mr. HARRY THOMPSON remarked that one pleasing feature about this instrument was that if everything else failed, they could all turn tailors.

On the motion of Mr. ELPHICK, a hearty vote of thanks was accorded to Mr. Cameron for presiding.

*Demonstration of the Rontgen X Rays.*

The members afterwards adjourned to the Masonic Hall, where a lecture and demonstration of the Rontgen Rays were given by Professor George Paton, of the Cirencester Royal Agricultural College.

Professor PATON, who had a most cordial reception, said: It is not my intention to night to give you a history of the development of the X rays, since their discovery a few months ago by Professor Rontgen, because the field of research opened up by these wonderful rays, even in that very short period of time, has become occupied by so many hard-working investigators that it has been quite impossible for anyone to keep in touch with all they have done, and all their observations are chronicled in our daily, weekly, and monthly papers and magazines. My object will be, as far as my ability goes, to show you some of the uses to which the X rays may be put, and also to describe what I consider the most convenient apparatus to use in producing these rays.

To begin with, then, I shall show a number of lantern slides, illustrating their use in conjunction with the photographic plate, as applied more particularly to surgery. [Slide thrown on the screen, representing the bones of a human hand.] You will notice that the bones are rendered more distinctly visible than the fleshy parts, so much so that any fracture or displacement could be exactly located. This is because bones are more opaque to the rays than flesh. For the same reason foreign substances, such as needles, bullets, etc., although deeply embedded in the flesh, can be skiagraphed. Coins, etc., have been taken inside of purses, and boxes and a pair of scissors and such like through the Edinburgh Directory. But what is still more important, the heart and other organs have been skiagraphed, and diseases like stone in the bladder have been successfully diagnosed. So you may take it as a general rule that the denser the substance the more opaque will it be to the X rays. I believe there are a few exceptions to this rule, but I think you will find it a very useful guide in judging the length of exposure of different substances. Of course, at the same time, taking into account the distance between the plate and the tube, the exposure varies as the square of the distance. [Several slides were then thrown on the screen, in illustration of this.]

We now come to the tubes which led to the discovery of the X rays. Nos. 1 and 2 are Geissler's tubes, used principally for spectrum analysis. No. 3 is a Crooks' tube, showing that gas can be rendered fluorescent by the action of the cathode rays. I wish to say a very few words with regard to these tubes and their connection with the discovery of the X rays. A perfect vacuum is a perfect insulator; that is, you cannot induce a current of electricity to pass through a perfect vacuum. Dry air, under great pressure, also offers a high resistance, and between these extremes there are degrees of rarification which admit of a flow of electricity and present many beautiful and remarkable phenomena. [Slides were here shown, representing the tubes which led to the discovery of the X rays.] Glass tubes, such as those on the screen, are used for this purpose. By means of a platinum wire fused into each end of the tube, currents from an electric machine, or more frequently sparks from an induction coil, are allowed to pass, which renders the gas inside the tube incandescent, and thus enables us to study its spectra. Now, if these tubes be

pretty highly exhausted, you still get the bright glow when the current passes; but this is not due to incandescent gas, but to the impingment of the cathode rays on the glass, causing it to to fluoresce. [Crooks' radiant matter tube shown here.] This slide illustrates a very interesting experiment by Professor Crooks, which I think, will show you pretty clearly that the fluorescence is due to the cathode rays. I direct your attention more particularly to this experiment because it is from the same source that we now get the X rays. In this tube the positive electrode or anode tubes, the form of a metal cross, and the negative or cathode is a round aluminium disc. Now, when the electric current is turned on from the induction coil the part of the tube directly behind the metal cross remains dark, and the other part, which is unprotected, receives a bombardment of radiant matter from the cathode, and is thus rendered fluorescent. It was also found by Crooks that some metals threw darker shadows than others; for example, that platinum threw a darker shadow than aluminium; but, unfortunately, he did not perceive then (nearly 20 years ago) as Röntgen has done since, that there was in this radiant matter coming from the cathode a constituent ray, powerful enough not only to penetrate metal but even the glass tube itself. Crooks, you see, came very near discovering the X rays, but in 1894, I think, Lenard came nearer it still. Observing the comparative transparency of aluminium, he constructed in a Crooks' tube a window of that metal, and found that the cathode rays penetrated this window and acted on a photographic plate, and that they continued to act on the plate although cardboard and other substances were interposed.

Now I think we may safely arrive at this conclusion, that a long period of hard work by such patient investigators as Crooks, Lenard, and others has led up to the wonderful results obtained by Professor Rontgen. Still, I think that Rontgen has a perfect right to adhere to the individuality of his X rays. I shall not trouble you here with my reasons for so thinking, but I hope to be able to show you later on that results can now be got by the outcome of Rontgen's experiments that could not ever be approached before.

The next slide shows you the up-to-date tube and fluorescent screens. You will notice that the tube is only a modification of a Crooks' tube, the cathode being a cup-shaped piece of aluminium placed at one end of the tube, and the anode a flat piece of platinum placed at the other end and sloping at an angle of 45°, so as to reflect the emanations it receives from the cathode in a direction at right angles to the axis of the tubes. The perfecting of this tube, I believe, has been the work of Mr. Jackson, of King's College, London. It is known as the focus tube, and costs from 20s. to 30s. The fluorescent screens here represented are also of the very latest type. The round one is by Newton and Co., London, and costs £4 4s.; the square one is by Baird and Tatlock, Glasgow, and costs £1 1s. I have experimented with both these screens, and the guinea one I found gave by far the best results.

The next slide shows you how to use the X rays in conjunction with the photographic plate, as a means of radiographing or skiagraphing the hand or other object. The photo plate is enclosed in a light tight envelope, and placed under a tube, film side up. The hand is then placed on the top of the plate, and the X rays allowed to pass down through it on to this sensative film. The plate is then developed in the usual way. As this slide also shows the apparatus used in producing the X rays, I will here take the opportunity of describing it. First you must have a current of electricity, and in this case it is produced by 6 "Grove's cells." A "Grove's cell" consists of a non-porous pot containing a zinc plate and dilute sulphuric acid, into which is immersed a porous pot containing a platinum plate and strong nitric acid. The action of the acids on the metals sets up a current of electricity which is afterwards passed through an inductive coil in order to raise its tension. By having a well exhausted tube and a very high tension current of electricity passing

through it, the best conditions for producing the X rays have been attained. [The lecturer here showed a spark before and after passing through the coil.] The most convenient way of getting the current of electricity is to draw it from the street mains, or failing that to have an accumulator or storage battery, which you can draw from and have re-charged at will. The coil you see here in the slide is an "Apps" induction, supplied by Newton & Co., London, and the one on the table is a "Ruhmkorff," supplied by Baird & Tatlock, Glasgow. It is essential to have a good coil; one giving a spark of from 2½ to 3 inches is good enough for hand or leg work, but for veterinary work I should advise you to get one giving a 7 inch spark. As regards the tube, I should not purchase it at all until I had seen it do its work.

The next slide illustrates the use of the fluorescent screen in conjunction with the X rays. Since the perfecting of this screen the X rays are of much greater service to the veterinary surgeon than before. Then the animal had to be chloroformed in order to keep it steady until the bones could be

HOW TO SKIAGRAPH THE HAND.
(*a*) Battery. (*b*) Coil. (*c*) X Ray Tube. (*d*) Photo-plate enclosed in light-tight envelope.

skiagraphed: now the bones can be rendered instantaneously visible by means of the screen. All you want to do is to darken the stable, or have a dark cloth to throw over your head, and put the animal in the doorway of a loose box, and if necessary wedge it in by a couple of bundles of straw, and if necessary hold up a forefoot. Putting the animal in the doorway prevents it moving sideways and endangering the apparatus. The screen is then passed over the parts in a manner shown by the lantern slide. The screen which I have found most useful consists of a piece of thin wood or strong paper coated with barium platino-cyanide or potassium platino cyanide and mounted in a modern frame. The X rays have the power of making these salts of barium and potassium fluoresce. If the hand be interposed between the screen and the X rays tube, it partly protects the screen from the action of the rays. It is advisable on such work as this to allow the coil to remain in its box, as a protection against injury. The accumulator, tube, and screen might

also be made to pack away in the same box with the coil, thus confining the

HOW TO USE THE SCREEN IN DIAGNOSING BONE DISEASES, ETC.
(*a*) Accumulator. (*b*) Coil. (*c*) X Ray Tube. (*d*) Fluorescent Screen.

Bones in Horse's Foot. (Front view.) 25′ exposure.

Bones in Cow's Foot. 15′ exposure.

whole apparatus in small enough space to be carried about in a surgeon's bag.

The lecturer then proceeded to give a practical demonstration of the Rontgen rays, making use of the various apparatus which he had thus described. He took occasion to photograph the hands and arms of several of the audience, and also the leg of a horse, the bones of which were clearly seen. The lecture was highly interesting, and it was evidently much appreciated by the veterinarians present.

The PRESIDENT, in conveying a vote of thanks to Professor Paton, remarked that the medical profession had employed these Rontgen rays with considerable success in relieving humanity, and the veterinary profession was trying to follow in their footsteps.

The proceedings afterwards terminated.

## YORKSHIRE VETERINARY MEDICAL ASSOCIATION.

THE summer quarterly meeting was held at the Queen's Hotel, Leeds, on July 31st, Mr. J. Clarkson, Garforth, president, in the chair. The following members were present: Messrs. J. E. Scriven, Tadcaster, hon. treasurer; A. McCarmick, Leeds; Philip Deighton, Selby and Riccall; Gavin Scott, Scarobro'; F. W. S. Clough, Morley; Sam Chambers, Kirkheaton; S. Wharam, Leeds; J. Cooke, Scarboro'; A. W. Mason, Leeds; A. W. Briggs, Halifax; J. Atcherley, Harrogate; G. Whitehead, Batley; H. Snarry, York. The visitors were: Messrs. C. Radway, A. J. Lane, E. Murray, Malton; E. Child (veterinary student), H. Dyson, Huddersfield.

The SECRETARY (Mr. Frank Somers) announced receipt of letters from gentlemen, regretting their inability to be present, including Professors Williams, W. O. Williams, Pritchard, and Penberthy, and Messrs. G. W. Carter, Keighley, and J. Anson, Sheffield.

### *Election and Nomination of Members.*

On the motion of Mr. SOMERS, and seconded by the PRESIDENT, Mr. H. Newsome, of Thornbury, was elected a member.

Mr. C. Drabble, of Bradford, was nominated for membership by Mr. SOMERS.

### *A Recent Criticism of the Profession.*

Mr. SOMERS said that in accordance with the wish of the last meeting he had written to Mr. T. Myers, butcher, of Leeds, with reference to a criticism of the profession on the occasion of a deputation from the National Federation of Meat Trades to the President of the Local Government Board (Mr. Chaplin) on the subject of tuberculosis. According to a report that was published in the *Yorkshire Post* of the interview, Mr. Myers was alleged to have said that "he heard that veterinary surgeons told cowkeepers, when their beasts were attacked with tuberculosis, to fatten them up and send them to the market, and the butcher who bought them had to bear the loss." Mr. Myers had replied, "In answer to yours of this morning, I beg to contradict most emphatically that I made any such statement as you mention. I have not seen the *Yorkshire Post* report, therefore I could not know anything about it. I think you know me better than to think I could make any such foolish statement, confessing, as I do, that veterinarians cannot always tell when the disease may be in its first stage."

Mr. BRIGGS thought that Mr. Myers himself ought to make known his denial through the same channel as the report was published. He accordingly moved: "That, in the opinion of this meeting, after duly considering the text of Mr. Myer's reply to the challenge issued to him at the instance of this Association in April last, and seeing that his attention was directed to the publication of the alleged statement in the *Yorkshire Post*, Mr. Myers ought, in all fairness to the veterinary profession, to have given an emphatic denial to the statement through the medium of the same journal. This Association

is also anxious to draw the attention of the readers of the *Yorkshire Post* to the fact that Mr. Myers was not the President of the National Federation of Meat Traders, as reported in the said issue of the *Yorkshire Post*."

Mr. A. W. MASON seconded, and the resolution was unanimously agreed to.

### *The Serving on Juries.*

The circular letter of the Southern Counties V.M.A. was read.

The PRESIDENT emphasised the importance of the two matters mentionep in the communication. They ought certainly, in his opinion, to try to get the liability of serving upon juries to be removed. He invited the opinion of the members on the subject. As to the question of fees, that was a matter which touched them very closely, and he need not say very much about it.

Mr. J. COOKE pointed out that the question of serving on juries had been discussed on various occasions by different societies, and in the professional periodicals. If the opinion of the profession were obtained, he thought it would be found that the majority of them were in favour of an Act of Parliament being passed to exempt them from serving upon juries. He thought they had a justifiable reason in asking for a Bill with that object in view.

Mr. MASON observed that it had been the endeavour of the Council, and it was their wish now, if possible, to get an Act of Parliament exempting veterinary surgeons from being called upon to serve as jurors. One of their presidents had made inquiries of a Government Department, and was advised not to press the point, because it would not be acceded to them. That, however, was no reason why they, as a profession, should not keep on agitating. The more they agitated, the more support they were likely to get, and it was possible that they might get in the thin edge of the wedge.

Mr. SOMERS moved a resolution supporting the action of the Southern Counties Association.

Mr. J. E. SCRIVEN seconded, and the resolution was adopted without dissent.

### *The late Mr. J. M. Axe.*

Mr. MASON moved a vote of condolence with the family of the late Mr. J. M. Axe, of Doncaster, to whose worth he testified both professionally and socially.

The resolution was seconded by the PRESIDENT, supported by Mr. COOKE, and agreed to in silence.

### *Rupture of Rectum.*

BY MR. P. DEIGHTON.

A ten-year old shire mare in good condition, and which had previously had two or three foals. On the 2nd of June she was served by a very vigorous shire horse, and directly afterwards was put into the cart shafts to lead manure. The owner was obliged to take her out, as she began to show pain, making small pieces of dung, etc. She was taken home and given a colic draught; she continued to show a little pain all the afternoon. I was called in to see her at night, and found the pulse up and breathing slightly accelerated, gave her an anodyne and left. Next day found things much worse; the defecation going on very frequently and in small pieces, and continual straining. I examined per rectum, which I found empty for about 10 inches. Then I found a mass of dung, and after removing it, found a rupture in the rectum, about 14 inches from the anus. From this day, June 3rd, the dung had to be removed by the hand or injections. The mare gradually got worse day by day, smelt bad, and strained occasionally; no appetite, refused food from the first day. I called in my friend, Mr. Scriven, on 10th June. The mare eventually died on the 12th June, ten days after copulation. The mare was removed five miles in a cart. I found about

two yards of the small intestines had come through the rupture in the rectum. The *post-mortem* revealed extensive peritonitis, and a rupture in the rectum six inches in length. There was no communication with vagina or uterus. Now, as there is possibly some law to follow, I refrain from mentioning what I think was the cause of the rupture, and hope that some of the gentlemen present will help me in the matter.

A discussion *in camera* took place, as the matter was still *sub judice*, among those speaking being Mr. Scriven, Mr. Briggs, and Mr. S. Wharam.

### *Radiographing and Chloroforming Small Animals.*

BY MR. COOKE.

The subject of his first remarks was a rough-haired, cross-bred dog, which fell over a cliff and fractured the hind limb on two separate occasions in two separate places. Considering that radiography was all the rage, he thought it would be interesting to the members if he got a specimen of the animal radiographed. He took the dog to an exhibition at Scarborough, and had it radiographed by Professor Coard. He believed it was the first canine subject that had been radiographed. The fracture of the femur was shown, but unfortunately the second fracture which occurred below the hock he was unable to get. He had no doubt that radiography would be of great use to them in the diagnosis of diseases when it became more perfected. This animal was placed under chloroform. It took him 10 minutes to get under the influence, and he was kept under the influence 35 minutes.

Mr. COOKE read some notes taken by Professor Coard. Afterwards he exhibited some chloroforming and securing appliances which, he explained, were brought out by Professor Hobday. He found the hobbles very useful for securing animals for surgical operations and for chloroforming purposes, because there was no restrictions on the respiratory movements. Up to the time of trying this cap he had entirely given up the use of chloroforming in canine practice, as he found by the old method of procedure death was the rule rather than the exception, with diseased dogs especially. The dogs he had placed under anæsthesia by this means were not diseased. He had not had an opportunity of using it largely, as he had only had it in his possession about three weeks. With regard to chloroform itself, he thought the pure was decidedly preferable, as a smaller quantity was required, and the cost was not greater than methylated. There was less liability to death, and especially in horses there was a saving in time. With pure chloroform he produced anæsthesia in a horse in less than ten minutes, whereas with methylated chloroform he found seven or eight minutes more were required. He had made a few rough notes of animals placed under chloroform by means of this apparatus.

The first subject, which was a rough fox terrier, aged 10 months, was tried without preventing the admission of air to the cap. Half an ounce of pure chloroform was placed in the bottle, and for 20 minutes he tried to get the animal under its influence without effect. Another half an ounce added produced the effect in five minutes. The dog was kept under the influence for 14 minutes.

A black French poodle, aged eight months. The bottle was nearly filled with methylated chloroform. The anæsthesia was produced in six minutes. The hand in this case was placed over the nozzle partly occluding the air. He tried for 25 minutes to destroy the animal without effect.

A cat, age 18 months, and slightly mangey. One ounce of chloroform was placed in a bottle and anæsthesia was produced in three minutes. The hand was placed over the nozzle, partly preventing the admission of air, and for 25 minutes he tried to destroy the animal without effect.

A rough-haired terrier, age two-and-a-half years. The bottle was nearly filled with methylated chloroform and anæsthesia was produced in 10 minutes. The hand was placed over the nozzle partly occluding the air. He also tried for 25 minutes to destroy this animal without effect.

The next subject was one for radiography. It was a very rough-haired cross-bred dog, aged two years and three months. The bottle was filled with pure chloroform and anæsthesia was produced in 10 minutes. The hand was placed loosely over the nozzle. This took place in a warm close room. The dog was kept under the influence altogether about 35 minutes.

He also experimented upon a rough fox-terrier bitch, pregnant, aged one year. An ounce of chloroform was used and it was eight minutes going under the influence, and for surgical purposes it was kept under the influence of chloroform for ten minutes.

*Tuberculosis of the Spleen in the Horse.*

Mr. COOKE said his notes were casually made at the time that he saw the animal in question. Standard authors gave no diagnostic symptoms. Professor Williams in his work on Veterinary Medicine said that there were no diagnostic symptoms by which this disease could be recognised during life—the only symptom that he gave being pallidity of the mucous membrane—and that two cases had been reported where the symptoms shown was a tendency to rush back when the head was touched. He (Mr. Cooke) had had two cases under his notice with symptoms so similar that he thought when taken collectively there would be no difficulty in diagnosing this disease. To show that when the symptom was taken individually mistakes might occur, he might say that the former case was under the notice of four veterinary surgeons before his advice was asked. One considered the brain affected, another spinal injury, and two some chronic form of indigestion. The first case was reported in THE VETERINARY JOURNAL in 1890. The symptoms were so similar in the two cases that his description of the fresh case would suffice.

A brown coaching filly, aged three years, belonging to Mr. Bishop, of Haburn Wike, near Scarboro'. From the history he gleaned that the animal was unwell last autumn, and it was thought to be toothache or some disease of the teeth. The position of the animal was so characteristic of the former case of tuberculosis that he had under his charge that he was led to ask the question whether it had ever been stabled with cows, as in the former case, the animal was stabled for nearly two years with cows. He ascertained that the animal when stabled had never been in any other place but a cowshed; also that two years ago several cows were shot which were described to him as piners, evidently pointing to tuberculosis. This might be a coincidence but it was worth noting. He found no fault with the excretions. The appearance was generally unthrifty, slightly roached back; difficulty in getting head down, the animal being unable to eat any food from the floor; pining of the muscles, especially of the neck, back of shoulders, and front of chest; stiffness of gait and turning; when turned round sharply a slight grunt was emitted. When the nose or mouth was touched the animal rushed back, and somewhat resembled a horse suffering from a mild form of tetanus. It lay a great deal, with limbs stretched out and placed the head on the knees. When standing the head was occasionally resting on the manger or any other substance. In rising from the ground the animal uses the hind limbs first in a similar way to the cow. The visible mucous membrane was pallid; frequent pulse 55; temperature 101; appetite fairly good.

Diagnosis—tuberculosis of the spleen. Prognosis—death. He recommended slaughter. The owner having spare grazing, turned it out to grass oft the bank sides, as it was unable to grass in the usual way owing to its not

being able to get its head down. A message was left on the 20th of July, to say that the animal was doing no good and that it could be shot for his inspection at any time. He again visited the animal on the 27th July, with the object of photography. He was then told that the animal did not lie so much, but when going into that position she walked round in a circle, dog-fashion, before dropping. She was now grazing on the bank sides and did not seem so sensitive about the nose, that was to say, she was not inclined to rush back so much. The pulse was 65; temperature 101. It was his intention to try the tuberculin test, but he had not the opportunity. As to the *post-mortem*, all the internal organs were pale and flabby. Parts of the spleen, pancreas, and lungs were forwarded to Professor McFadyean for examination microscopically, and he kindly and promptly reported that the lesion in the spleen was tuberculosis. Singularly this spleen only weighed 1 lb. 14½ ozs., whereas the weight of the spleen in the other case which came under his notice was 16 lbs. Mr. Cooke exhibited six photographs showing the characteristic position of the animal during life. He also showed part of the spleen.

The PRESIDENT remarked upon the importance of having discussions upon matters such as those now laid before them, and personally thanked Mr. Cooke.

Mr. SOMERS congratulated Mr. Cooke upon his up-to-date remarks. With reference to tuberculosis of the spleen he mentioned that some time ago he had a case where the animal wasted away and absolutely refused food of any kind.

Mr. BRIGGS: Was tuberculosis confined to the spleen? Was the liver free?

Mr. COOKE: Yes.

Mr. BRIGGS, alluding to the chloroforming of small animals, inquired if any member had intentionally destroyed dogs by chloroforming them?

Mr. MASON said he had tried to destroy dogs in that way but could not, and had gone back to the use of prussic acid.

Mr. SOMERS remarked that he had never tried to kill them by using chloroform, because the administering of prussic acid was a much easier method.

Mr. BRIGGS mentioned that he had a client who had insisted that he should chloroform a horse before shooting it.

Mr. LANE said he had a small terrier to destroy, and, thinking that pure chloroform would kill the animal, he gave it an ounce. The chloroform did not seem to do the dog any harm, and he gave it some more, but it recovered.

The PRESIDENT gave his experience of administering chloroform to three dogs. The first case, which was at College, was a failure, but in the other two instances the dogs were certainly chloroformed to death.

Mr. COOKE was surprised at the remarks of Mr. Mason and Mr. Briggs. At first he thought they were joking, but afterwards concluded that they were serious. Both dogs and cats were susceptible to death under the chloroform when administered in the ordinary way. He had had animals die like flies. In regard to putting small animals to death, he never adopted any other means than chloroform in dogs and cats taken to his place. He reckoned from two to two-and-a-half and three minutes quite sufficient. He put the animal to be destroyed in a box, and put about 1½ oz. of chloroform on the sponge. He found that death resulted in two or three minutes without any recognisable pain.

Mr. BRIGGS said that a few years ago the Nizam of Hyderabad appointed a commission, upon which several eminent Englishmen sat, to decide whether chloroform was a dangerous drug to use as an anæsthetic. The result of their inquiry was that they could not poison an animal by chloroforming except in certain cases.

Mr. SCRIVEN (to Mr. Cooke): Do you put the animal in a box and exclude the air?

Mr. COOKE: A certain amount of ventilation is given for the first minute, then the box is closed.

Mr. BRIGGS: But that is suffocation.

Mr. WHARAM said his experience was the same as that of Mr. Mason and Mr. Briggs. With him chloroform had not been a success, and he generally administered prussic acid.

Mr. CHAMBERS, referring to the horse described by Mr. Cooke, asked whether it was possible to get the bones.

Mr. COOKE said it was not, as the animal was slaughtered.

The PRESIDENT, in closing the discussion, remarked that they must congratulate Mr. Cooke upon bringing forward the cases that he had. At the same time he could not quite agree with Mr. Cooke on one point, and that was about not being able to reach the ground for food. He had recently a case where the animal grazed right up to its death.

## *The Treatment of Chest Affections.*

BY. MR. S. WHARAM.

There are so many diseases in the treatment of which it is the usual course to apply counter-irritants, that it would be impossible for me in a short communication ro give more than the outline of the varied uses and abuses of those very common applications. Therefore I intend to confine myself to counter-irritation in affections of the chest, and my reason for so doing is because I believe the most diverse opinions exist, not simply as to whether certain applications are more or less beneficial than others but that they positively do harm. Professor Williams, in his book, "The Principles and Practice of Veterinary Medicine" says (page 613 on pneumonia—"The application of the so-called counter-irritants is not only useless but dangerous in the earlier stages, and uncalled for when convalescence is progressing favourably. On page 621 Professor Williams says referring to pleurisy. "The so-called counter-irritants, with rare exceptions, are injurious, and cantharides, turpentine and mustard are condemned." I agree with the Professor that when convalescence is progressing favourably there is no necessity for a counter-irritant, but I consider the statement to be too sweeping, and apt to deter us from applying counter-irritants to the advantage of both ourselves and patients. Professor Williams also states that his views are endorsed by physicians, and quoted Dr. Wilson Fox and others.

As I was constantly hearing so many different opinions as to the value of applications to the chest, and not willing to accept the views said to be held by the majority of physicians, in human medicines, I conducted experiments on my own account, which have been carried out for 12 months—January 1st, 1895 to December 31st—on three studs of horses, the total number being 612. In every case of chest affection during that period, the majority of which were congestion of the lungs or pleurisy, each side received a moderate application of mustard, not exceeding 12 inches square in the first instance, and if in six hours' time no improvement was manifest blankets were applied after having been wrung out of hot water, with felt pack outside. Out of 70 applications of mustard it was only found necessary to use the blankets nine times, and of these nine only one horse died. Mustard was chosen for its general convenience, being readily prepared by mixing with cold water into a paste, quickly applied, two minutes rubbing being sufficient, with brown paper placed over before the rug was put on, easily removed if necessary, not causing prolonged irritation and uniform in its action, fluids being apt to blister severely at the most depending parts.

An indiscriminate use of anything is always to be condemned, but if counter-irritation is applied as described, the patient being well clothed and allowed

plenty of air, very little inconvenience and no distress is caused by its use. I have frequently seen mustard and other irritants applied all over the ribs at each side, the throat and down the neck to the breast, the latter especially causing much pain, profuse perspiration, and unquestionably doing much harm. The method I first described has worked so satisfactorily, as compared with previous experience, that it will now be adhered to for the future by me. These remarks are made not with the idea of laying down any hard and fast rule, for every case requires separate consideration; but to show that a moderate use of what is so often condemned is often beneficial. After perusing the most recent medical works I find that in the treatment of congestion of the lungs, pneumonia, pleurisy, etc., counter-irritants are recommended, and the following remarks by Dr. Thorogood is evidently a step in the right direction:—

"Although some therapeutists have of late been disposed to question the value of counter-irritants, on the theoretical ground of inability to explain their mode of action, yet there is not wanting evidence, both from clinical observation and physiological experiment, that irritation in one part of the body may affect the functions and nutrition of other parts. That the stimulation of the surface can influence decidedly the circulation of deeper parts has been demonstrated by Dr. Brown Sequard, for he found that irritation of the skin of the back over the kidneys caused a contraction of the arteries supplying those organs. From this experiment we can understand how a blister may relieve a sudden congestion in the lungs or brain, and how it may act in restoring tone to dilated and paralysed capillaries."

Mr. CHAMBERS agreed with Mr. Wharam in a moderate use of counter-irritants.

Mr. ATCHERLEY also expressed the opinion that if they did not sometimes follow the treatment described a good many animals would die.

Mr. BRIGGS said he must congratulate Mr. Wharam upon his paper. Anyone who had charge of an omnibus stable, where horses were worked hard, knew that if they did not use mustard and other applications they would lose their animals.

Mr. LANE said that as a junior member of the profession he must say that he did not agree with the application of these counter-irritants, especially the use of mustard. During the last three or four years he had done work in London and Leeds, and had not followed the treatment described. Personally, he thought that if they used anything at all it should be something of a soothing nature. He thought that the removal of a horse, perhaps, from a crowded stable into a loose box, where it got plenty of fresh air, was more beneficial than the use of counter-irritants.

Mr. WHITEHEAD said he was a believer in counter-irritation. He had a few railway horses under control and his cases did well with the treatment in question.

Mr. COOKE believed that mustard was a painful application.

Mr. CLOUGH said he had followed the mode of treatment on lines similar to those described by Mr. Wharam.

Mr. SOMERS remarked that, as Mr. Wharam had pointed out, every case required separate consideration. There was no doubt that in some chest affections stimulants causing the circulation to increase was a very good method to adopt, and particularly in immediate cases of congestion.

The PRESIDENT said that on this subject he found himself in the minority. He did not believe in mustard.

Mr. WHARAM said that from the discussion it appeared that the majority agreed with him that the application of mustard was beneficial. He did not advocate, as many people did, blistering a horse all over; that was distinctly detrimental. It would be impossible for him to get the same results without

mustard. If the application was done in good time they could obtain good results. Mustard was easily applied, and they could leave the application in the hands of foremen.

Mr. SCRIVEN said that both he and his partner (the President) were rather antagonistic towards the application of mustard. Occasionally he applied mustard himself, but he did not leave it with the foreman.

Mr. WHARAM wished to explain that he instructed the men as to when and how to apply the mustard. He added that out of a stud of 200 horses last year they only lost one animal, and that dropped dead in the street from heart disease.

Mr. LANE: There is more in fresh air than in giving a poor brute a little more pain.

### *Rupture of Stomach.*

Mr. CHAMBERS brought forward a case of rupture of the stomach following castration.

After listening to the paper, the PRESIDENT and other members said the rupture could not have arisen from the act of castration.

Mr. CHAMBERS said the information he could get was very little. He did not, however, think there had been any previous disease; he thought that the animal must have overeaten himself.

### *Uncommon Accident to a Foal's Foot.*

BY MR. J. E. SCRIVEN.

The subject of communication is a carting foal, about a fortnight old, the property of Mr. D. Stocker, Towton. It was running in a pasture with its mother, under careful observation and management. On May 10th it was found standing, holding the near foreleg clear of the ground, and quite afraid to move. It was with great difficulty travelled home, a distance of a few hundred yards, put into a box, and our services called to it.

On examining the injured member, I found the entire hoof-wall and sole had been torn off. How this accident happened is purely a matter of conjecture, the severed hoof being found in the middle of the field some distance from where the foal was first noticed. I am strongly of opinion that it must have been caused by the mare treading it off, as I can find no other solution of the difficulty. The piece of surrounding ground is almost level, quite free from rabbit holes, wire fencing, or any thing where the animal might have been fast. You will notice how cleanly the hoof had been torn off, the horny laminæ scarcely being broken. The toe of the os pedis, about 1 inch deep, and 1¼ inch across, of a semi-lunar shape and entirely devoid of covering, was protruding injuriously. The foal had evidently been walking on it on its way home, part of which was on the turnpike; the bone was blackened and apparently necrosis was almost certain to supervene.

My client thought it would be best to destroy it, but I advised a trial. The coagulated blood adherent to the sensitive laminæ I allowed to remain; I then bound up the whole foot in cotton and boracic acid ointment, using the ointment very freely, as I intended it to remain at least two days before removal. On the second day I removed the dressing, and was agreeably surprised to find no hæmorrhage, and the pedal bone gradually disappearing. A quantity of a watery discharge was present and continued for a week, but there was never any fœtor. In the meantime I had a leather boot made like a socket, reaching up to the fetlock, just large enough to hold the foot and dressings. It was now dressed daily, freely using the same dressing as before.

In a week's time the new horn had grown fully ½ inch from the coronary

band, and in double that time 1½ inch, the sole and frog growing more rapidly and growing from heel to toe.

By the end of June the wall and sole almost met at the toe, and no doubt would have done but for a small ridge of the pedal bone preventing. Now at this time the foal could walk about, and had an almost perfect foot again. Discontinued dressing. During the course of the case the opposite leg showed signs of breaking down, but now since using the lame one it is rapidly regaining its natural position. The animal can now trot on the hard road and shews only the slightest lameness, the only thing noticeable being a tendency to club-footedness, which I expect the animal to grow out of in time.

Mr. MASON said he was afraid that the foot would never form like the other one.

The PRESIDENT said the case brought out two points. One was the usefulness of boracic acid. It was a drug which seemed to be greatly scoffed at, but this case, at any rate, went to show its value. The second point was, always to think twice before destroying very young animals.

Mr. BRIGGS: That is to say, give a chance to the best doctor—nature.

### *Influenza amongst Horses.*

Mr. BRIGGS said that Mr. Wharam had covered much of the ground that he had intended to take. One of his strong points was the usefulness of mustard in cases of influenza, such as they had had since Christmas. He had also intended to remark upon certain cases where death had supervened after an animal had gone to work, that was when the animal had been put to work too soon. His experience was that that was a serious mistake to make. He found that pleurisy was the worst complication in all these forms of influenza. As a sequel of this complaint, he had had two or three cases of purpura hæmorrhagica which had yielded to treatment, though very slowly. He had something like 14 or 15 horses suffering from it. It was, no doubt, infectious; it had been three months going through some stables, but in no case had it taken a horse twice. He wished to recommend the treatment that Mr. Wharam had advocated. He was a strong believer in mustard, which was handy, but he always mixed it with aired water.

Mr. MASON said he was one of those individuals who did not apply mustard.

Mr. WHITEHEAD afterwards mentioned a case of emphysema in cows.

The PRESIDENT proposed a vote of thanks to the members who had introduced subjects to the meeting, and this was seconded by Mr. SOMERS and cordially agreed to.

A hearty vote of thanks was also accorded to the President, the speakers to the resolution dwelling upon the success that had attended Mr. Clarkson's idea of having several short papers for discussion, instead of only one.

The PRESIDENT, in reply, said his idea was that in having a series of papers and addresses, they would have greater variety and more interest in the discussions.

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A NEW ANTISEPTIC.—The latest is bicarbonate of soda impregnated with eucalyptus oil in the proportion of 1 pint of the oil to 1 cwt. of the bicarbonate; 57 parts of this mixture are worked up with 43 parts of bleaching powder, and the result is a production of a powder which, on being treated with water, will yield pure hydrochlorine acid. The eucalyptus oil is added simply to preserve the powder when in a dry state.

## CONTAGIOUS DISEASES ANIMALS ACT, 1894.

SUMMARY OF RETURNS OF OUTBREAKS, for the four weeks ending August 15th, 1896.

ENGLAND AND WALES.

| Pleuro-Pneumonia. | Swine Fever. | Glanders (including Farcy) | Rabies. | Anthrax. | —— |
|---|---|---|---|---|---|
| None | Outbreaks confirmed 324<br>Slaughtered, diseased, or exposed to infection 5,002 | Outbreaks reported 60<br>Animals reported during the four weeks attacked 87 | Cases in dogs reported 18<br>Dogs destroyed as having been exposed to infection 20 | Outbreaks reported 24<br>Animals attacked 49 | |

Glanders in London—41 outbreaks, 57 cases.

SCOTLAND.

| | | | | | |
|---|---|---|---|---|---|
| None | Outbreaks confirmed 37<br>Slaughtered, diseased, etc. 391 | Animals reported during the four weeks attacked in Lanarkshire ... 3 | None. | Outbreaks reported 8<br>Animals attacked 16 | |

IRELAND.

| | | | | | |
|---|---|---|---|---|---|
| None | Outbreaks confirmed 46<br>Slaughtered as diseased, etc. 232 | Outbreak reported 1<br>Animal reported during the four weeks attacked 1 | Cases in dogs reported 27<br>Other animals 11<br>Dogs destroyed, etc. ... 32 | None | |

## SANITARY SCIENCE.

THE London Sanitary Institute, incorporated in 1888, holds its fifteenth congress, from the 2nd to the 9th of this month, at Newcastle-upon-Tyne, and in connection with it, a Health Exhibition will be opened by H.R.H. The Duke of Cambridge, K.G., the President of the Institute. It appears from the programme that over 160 county councils, corporations, and local authorities, have appointed delegates to attend the congress, and as there are also over 1,800 members and associates in the Institute, there will probably be a large attendance. The subjects of the addresses, papers, and discussions, are as follows: Sanitary science and Preventive medicine, Engineering and Architecture, Chemistry, Meteorology, and Geology. The medical profession will be largely represented, and we earnestly hope the time is not far distant, when our own will take its part at these important gatherings, valuable as sources of knowledge to be gained, and in affording opportunities to promulgate the views of our profession on sanitary science and preventive medicine, in relation more especially to the lower animals.

## MIMOSA GUM AND MICROBE OF AFRICAN HORSE-SICKNESS.

In the report of the Director of the Colonial Bacteriological Institute for the past year, that officer in recounting experiments having for their object the determination of the normal habitat of the horse-sickness microbe in air, water, or soil, or vegetation resulting in the discovery of a microbe of identical form in species of a well-known and widely disseminated South African plant, says:—

"From time to time numerous experiments have been made by us with the object of determining the normal surroundings of the microbe which has been found in the blood of horses suffering from horse-sickness.

"One series of experiments which had been carried out on a fairly extensive scale consisted of inoculating portions of grass growing on a lawn with the blood of animals which had died of this disease. The portions thus infected were kept under glass and placed as far back as possible under such conditions of temperature as obtains in the season of horse-sickness. As a result of such inoculation experiments we found that a considerable number of fungi appeared on the grass. These were all of the kind known as filamentous and were all separated in a pure state. Unfortunately, we could not identify among any one of these spores, such as we have from time to time observed in the blood of horse-sick animals. In the case of one species which appeared on the panicles of the grass as small yellow grains and which subsequently, when placed in water gave rise to mycelium, spore carriers were found which were somewhat after the form and character of certain bodies which at wide intervals may be seen occurring singly in relation to the secretions of the lungs of horse-sick animals. Judging from this observation it would seem safe to infer that their appearance in the exudation of the horse was due to their having been inhaled when the animals were grazing. All the fungi which were isolated were made use of for inoculation experiments on horses but the results were in every case negative. The negative results thus obtained would seem to indicate either that couch grass is not a soil suited to the growth of the fungus of which I was in search or that the spores present in the blood were unable to germinate on grass. It may be known that in regard to 'rust' one species gives rise to a special spore, 'resting-spore,' which cannot germinate on wheat, although when germination is effected wheat is the special plant upon which it grows. This resting-spore requires to be placed upon the leaf of the barberry where it grows with the formation of spores that in turn readily germinate on wheat. Thus, supposing that our fungus does not grow on grass, it may be that the spores formed in blood are of a kind which requires some other plant for their germination. Soil, air, and water have also been investigated, but without success.

"Now, when the conditions under which infection of horses with horse-sickness are considered, it will be remembered, as it has been practically shown, that the animals receive infection when grazing while the veld is damp, and that infection is widely distributed over all South Africa. If, therefore, some plant is the carrier of the resting-spore it must be one of wide distribution throughout the country. From such considerations as these I was led to turn my attention to the *Mimoseæ*, a sub-order of the natural order *Leguminosæ*. The species of this sub-order of plants is widely distributed in Africa, although being chiefly tropical. They are well-known for the mucilaginous juices which they yield, under the name of Gum Arabic. It occurred to me that in attempting to investigate these plants I might with advantage in the first instance procure some of the gums yielded by such species, and examine these for the appearance of any traces of fungal life.

"Numerous kinds and qualities of gum arabic or acaciæ are known in

commerce. They are conveniently denominated by the name of the country producing them, as Gum Senegal, Gum Acaciæ Turkey, African gum, &c. I turned my attention in the first instance to the common African gum, of which I obtained two samples. Through the kindness of Messrs. Burroughs, Welcome & Co., of London, I was also enabled to obtain several samples of the gums of other countries.

"In examining one sample of gum by crushing it and dissolving it in a weak solution of carbolic acid in water, which might be considered as keeping the solution free from the growth of extraneous germs, I found, to my great astonishment, much jointed mycelium, such as we have found in some samples of horse-sick blood, and some brown resting-spores, which were likewise similar in form to the resting-spores found. Such resting-spores and mycelium could not be held as being so characteristic as to warrant us in even suggesting its identity, and the same remarks apply to the simple occurrence of resting-spores and mycelium in blood. On the other hand, however, the vegetative spores already described are so peculiar in form that a better inference could be drawn from their discovery. In the second sample of gum examined, I likewise found the resting-spores and mycelium, but to my delight I also found in great quantity *vegetative spores absolutely identical with those already described as occurring in the blood of animals which had died from horse-sickness.* Having discovered these, I prepared cover glasses of the solution which were thereafter stained, and in Fig. 6, Plate 2, will be seen some of the spores in question.

"Of foreign gums the following samples were examined :—

1. Oomra gum.
2. Persian insoluble gum.
3. Gum Acaciæ Turkey sorts.
4. Brown Bombay Amrad.
5. Fine Turkey gum picked in Trieste.
6. Ghatti gum.
7. Scented Bombay gum.

"In all of these, with the single exception of the fine picked Turkey gum, were to be found bodies which are in all probability resting-spores, although evidently of different species, and in many cases some mycelium.

"I inoculated horses with gum which was seen to contain the *vegetative* spores, but with only negative results. Of course it is free to infer that in such gum, which had probably been in a dried state for many years, the spores present would be dead, and therefore I attach no great import to the negative results accruing from inoculation with such gum.

"The observation just detailed is of much interest, for although we cannot definitely say that we have found the actual species of fungus, which would seem to be the cause of horse-sickness, existing on the Mimosa, yet we have fairly determined that certain species of fungi which have much in common with our horse-sickness microbe, find a resting-place during at least one cycle of their life on the gum exuded by such a plant. But our interest does not end here, for as we know of analogous fungi that different species inhabit different species of the same kind of plant, it is safe to infer that fungi similar to the one we are in search after may be found on the different kinds of Mimoseæ, and if we are to assume that one species of this fungus is deadly to horses, producing horse-sickness, then it is quite possible that other species of similar fungi may be dangerous to other species of animals. While there is, therefore, nothing definitely ascertained, the suggestiveness of the observation demands of us that these plants should for some time be looked upon as objects of suspicion, and as such I propose to regard them until such time as by further investigation more definite information is forthcoming."

## THE VETERINARY STUDENT.

We take the following extract from one of a series of clever articles in the *Weekly Scotsman* on the types of student life as presented in the Scottish metropolis. It is evident the author knows of what he writes. "Experience of many years has shown me that the embryo vets. who come from country homes are more likely to make their mark in the profession of their choice than those who hail from big towns and cities. In the first place the lad must show some liking for animals, some natural qualifications for treating their ailments, if he is to be a successful vet.; and opportunities for the growth of such qualifications are rare indeed amid large areas of bricks and mortar. But in the country—especially in a house where one or more horses are kept, where there is a dairy, and where domestic pets, biped and quadruped, abound, the lad with veterinary instincts finds these instincts developed all unconsciously by his surroundings. He learns much in that best of all preliminary schools, practical observation. He studies the habits of his future patients, and learns to diagnose many of their diseases from those habits. And here let me remark that the science of veterinary surgery differs from that of human surgery in one special particular which may not have struck the casual observer. The doctor or the physician can interrogate the patient as to his ailments, and the replies often indicate the treatment suitable. The vet. has to trust entirely to examination and observation; and for this reason particularly I think early training and surroundings have much to do with future success, apart altogether from individual proclivities. The fact is Dame Nature is the best nurse for the budding vet, and the glimpses to be caught of her in large towns are necessarily few and far between.

In many families it is decided, long before the lads leave the preparatory school, what their future calling shall be—a plan that answers well enough as far as the pulpit, the army, the civil service, and similar professions are concerned; but who can fancy a father saying, in family council—

"Let's see—there's Tom—what shall we make of Tom? Oh, we'll make a vet. of him."

Why, unless Tom had shown a decided liking and natural abilities for the profession, such a decision would be absurd. In nineteen cases out of twenty the time and money spent on the lad's education and college training would be wasted. He might grasp the theoretical part of the business, but the practical portion thereof he would never manage. So it follows that a very large proportion of the youths who, at Edina's two veterinary colleges, learn how to alleviate the sufferings of the brute creation are naturally qualified for the task they have set themselves. The percentages of failures at the periodic exams. are small; and, for a clever man, the profession offers good prospects.

It is really astonishing how gentle our friend Snaffle learns to be with the various animals that serve as object lessons for his studies. It might be supposed that familiarity with their sufferings would render the student callous, just as the drovers, who constantly handle sea-borne cattle, are among the most cruel of mankind. But the contrary is the case. The landlord of Snaffle's favourite house has a fox terrior, which is one day found to be suffering from some canine ailment.

"I can't make out what's wrong with Jip," says Boniface, anxiously. "I wish you would have a look at him, Mr. Snaffle; he's off his feed, and his coat's wrong, and he mopes about, not a bit like himself."

"All right—I'll have a squint at him. Here, Jip, old fellow, come here," and the patient obediently comes out from under the seat, and slowly approaches.

"Now then, old boy, what's wrong with you, eh?" and the speaker pats the

dog kindly, and gently examines him. Presently he says, "I should give him some sulphur and butter."

"Oh, I tried that," says Jip's owner, "but he wouldn't take it."

"Bosh," says Snaffle curtly. "Here, let me have a try," and the requisite materials being brought forth, are mixed professionally, and administered with a judicious combination of firmness and kindness which is one of the secrets of a vet.'s profession. Snaffle is fond of animals, and—by some curious law of Nature—animals divine the fact, and reciprocate the fondness by an amount of confidence and obedience which is at times astonishing.

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## TUBERCULOSIS.

At the Sixty-fourth Annual Meeting of the British Medical Association, held at Carlisle, on the 28th, 29th, 30th and 31st July, the consideration of this disease in relation to the public health, occupied a prominent part in the proceedings. Papers were read on The Seizure of Diseased Meat and Butchers' Claims for Compensation, on Milk Supply in Urban Districts, and The Public Health Aspects of Tuberculosis.

The outcome of the reading of these papers, and the discussions which followed them, was the following resolution :—

> "That it be remitted to the Parliamentary Bills Committee to approach the Government with the view to obtain a uniform scale of compensation in cases of carcasses of animals seized for tuberculosis, and this section of the British Medical Association expresses its opinion 'That in all cases where a carcass of a beast bought for over £8 and under £30, is seized for tuberculosis, the cost shall be equally divided in the following proportions, namely :
>
> "'One third by the seller or breeder of the animal ;
>
> "'One third by the butcher or other person to whom the animal belonged when it was seized ; and
>
> "'One third by the local authority ; or, as an alternative, that this disease (tuberculosis) be scheduled in the Contagious Diseases Animals Act with pleuro-pneumonia.'"

With all due respect to the medical profession, we venture to dispute the practicability of the alternative proposed, that tuberculosis in cattle should be dealt with in the same way as was pleuro-pneumonia. The investigations made by the veterinary profession have proved its existence to an alarming extent among dairy cows and cattle generally in this country. The disease, in all its aspects, has been thoroughly studied, and the results of these researches duly recorded. The veterinary literature on tuberculosis we would recommend to the notice of our medical brethren, as from it they would learn the magnitude of their request.—[Ed. *V. J.*]

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## EXPERIENCES OF A PASTEUR PATIENT.

A writer in the *Pall Mall Gazette* is relating his experiences as a patient in the Pasteur Institute. About a quarter to eleven, he says, the day's performance begins. The concierge, a good-looking, soldier-like fellow, with Napoleonic moustache and imperial, has struggled into a semi-military uniform and stands sentry at the door of the doctor's room, and the great hall is filled with an expectant crowd of all ranks and conditions of men. There are seldom less than sixty to eighty patients under treatment ; every day some new ones put in an appearance ; every day some, their treatment completed, go, with hearty

hand-shakes and good wishes, for among "*les mordues*" there is the comradeship conferred by the sense of a common danger and a common interest, and no feeling of social distinction mars the friendly intercourse of the bitten. There is a lady—a grand dame *de par le monde*—who comes here in a carriage and pair, with a flock of children, all bitten by a mad lap-dog. Vainly, with blandishments and the putting on of "side" does she strive for a recognition of her social status and the privilege of separate treatment. Vainly, for the "*égalité*" that is inscribed on all public buildings is a fact here, if nowhere else. There is no priority under "*la piqure*," but the priority of the newest patient.

The noise in the hall is increasing; a group of good-looking peasant girls are flirting, as good-looking girls will, with a crowd of lads; the flirtation degenerates into a romp, and the racket gets rather pronounced, so that one looks anxiously towards Napoleon, but he is a good-natured fellow and beams benignantly on the giddy young things. Presently he gives a stentorian shout of "Les Nouveaux," and silence settles down. It is the signal for new patients who have not yet undergone treatment to pass into the salle d'inscription for particulars of their cases to be taken down in the register. The examination is searching, and results in the Institute becoming possessed of most facts of your family history and of the dog's as well, so far as the latter are ascertainable. Although the Institute refuses no case in which there is any suspicion of rabies, it is careful to classify its cases, according to the weight of evidence.

After the new patients' cases have been duly entered, the surgeon passes into the operating-room, and a stentorian shout of "Preparez-vous" bring the waiting crowd to attention. Cases are treated in batches, the new being first attended to, and the others going in according to the stage of inoculation they have reached. After the inoculation, patients whose wounds are unhealed pass to another room where they are dressed.

The treatment is based upon Professor Pasteur's hypothesis that the virus of rabies, concentrated chiefly in the central nervous system, produces in its growth a chemical substance hostile to its own development, and that by drying the spinal cord the living virus gradually perishes, becoming absolutely inert after fourteen days' exposure to dry air, while the chemical antidote undergoes no change. The virus in its fourteenth day of exposure is, therefore, the most attenuated form in which it may still be regarded as active, and it is the virus in this stage that is used for the first inoculation of the human patient.

The virus employed in the inoculations is derived from rabbits, with the object of securing uniformity of result. The period of incubation of rabies in dogs is very uncertain, the average being six weeks. In the rabbit the maximum is no more than fifteen days, and by the employment of a special strong virus Professor Pasteur was able to ensure the development of rabies in seven days, and the death of the animal on the tenth day. The same virus is still employed, so that there is never any disturbance in this regular sequence of events, which would be of obvious inconvenience in an establishment where a constant supply of the virus in every degree of activity is essential for the daily treatment of patients. Each day at least one rabbit dies; the body is laid on ice, and, as soon as possible, dissected, and the spinal cord carefully removed and suspended in a glass bottle, the bottom of which is covered with a layer of caustic potash for the absorption of moisture. The bottle is labelled with the date and put away in a cupboard in a room kept at an even temperature, from which daylight is always excluded. Each spinal cord will supply material for about thirty inoculations. The fluid for inoculation is prepared by crushing a small piece of this dried cord with rather more than six times its bulk of sterilised veal broth. From

one to three cubic centimetres (15½ to 14¼ drops) of the fluid are used for each inoculation. Patients are inoculated in the sides, which are first dabbed with a solution of perchloride of mercury. and on the first day of treatment they receive injections on both left and right side of virus that has undergone fourteen and thirteen days' drying. This mild preparation confers protection against the effect of the second day's inoculation, for which virus of the twelfth and eleventh day is employed. On the third day ninth and tenth days' virus is used. After the fifth day the inoculation is made on one side only. By that time the virus of the sixth day's exposure is reached. Every day's treatment up to the ninth day shows a progressive increase in the strength of the virus, each injection conferring immunity against the effects of the stronger one by which it will be followed. On the ninth day the patient receives an injection of the most virulent virus used, that of the third day's exposure, which is fully equal in activity to the bite of a rabid dog. After that a somewhat less active virus is employed until the fourteenth and fifteenth days of treatment, when virus of the fullest activity is again used.

This is an outline of the ordinary treatment. Under the "intensive method," to which reference has already been made, the operations are in the beginning repeated twice daily, so that four days' strengths of virus are used each day, the result being that the more virulent preparations are reached in a hazardously short space of time, so that the risk of the patient's constitution standing the strain is an appreciable one. This treatment is only resorted to in cases of great severity. One such case that came under my own notice was that of a sergeant-major on Indian service, who was badly bitten by a rabid dog in north-east Bengal some time in May, and only succeeded in reaching the Pasteur Institute on July 7th, six weeks after the event. I am bound to say that my friend, the sergeant-major, looked none the worse for his experiences when I said good-bye to him a fortnight later; but it is certain that he ran as close a race for his life, then, as at any time during his soldiering experiences, and for the risk he incurred, he has nobody to thank but the well-meaning people whose efforts succeeded in upsetting a well-conceived scheme for the establishment of a Pasteur Institute in Bombay, even after the money and site had been provided and the services of a physician secured.

## Legal News.

IMPORTANT DECISION.—The first contribution of our Mr. B. 'Arris to this column, some months ago, was a complaint as to the injustice of the law in making him, a dog-fancier, take out a licence for every dog he had on his premises, although the dogs were only kept for sale. The blithering imbecility of the law in enforcing such a regulation is manifest. A dog licence is not transferable. Therefore if a dealer in animals takes out a licence for a dog this week, and sells it next, he cannot sell the licence with it, the Inland Revenue having decided that the purchaser must take out a fresh licence in his own name, which is about the most bare-faced piece of robbery on the part of the law that could be imagined. A case has now been heard in London against a veterinary surgeon. A customer had left a dog in his charge, which is a well-known practice among many people when leaving home for a time. Down swooped the majesty of the law on the veterinary surgeon, and summoned him for keeping a dog without a licence. He explained that, as he had frequently as many as forty dogs under his care at one time as a veterinary surgeon, it would be a very serious matter for him if he was convicted. Whereupon the Supervisor of Her Majesty's Excise Department declared that for every dog kept on his premises, he was liable

within the meaning of the Act. So the Bench fined him 10s. and costs. And a more pudding-headed piece of red tape injustice than this clause of the Act would be difficult to discover.—*Sporting Chronicle.*

SERIOUS CHARGE AGAINST A FARMER.—A SHOCKING CASE.—A revolting case, in which Samuel Flint, a farmer, of Greasley, near Eastwood, was charged with having caused a mare to be cruelly ill-treated between and including the 18th and 23rd July last, was investigated by the magistrates at Nottingham on Saturday. Mr. J. A. Francklin, Mr. A. Heymann, Mr. A. Radford, Mr. T. C. Birkin, and Mr. R. G. Hanson. Mr. E. Williams prosecuted on behalf of the R.S.P.C.A., whilst Mr. H. B. Clayton defended. Mr. Williams briefly described the condition in which the mare was found, a condition so revolting as, he contended, to imply on the part of the owner of the animal cruelty of a gross and shocking degree.—Inspector Rogers, R.S.P.C.A., stated that he visited defendant's farm, near Eastwood, on July 23rd, and found in a field there a mare lying in a pitiable condition. Her hind quarters were being eaten away by maggots, and when, with assistance, he pulled the animal with a rope on to its other side, a most horrifying sight met his view. It was no exaggeration to say that there were millions of maggots on the body, eating it up in all parts. The ear and the eye had been completely destroyed, and throughout the whole length of the carcase were suppurating sores. A small handful of hay lay near the animal's head, and before disturbing it witness offered it some clover. But it seemed quite unable to eat, and was evidently suffering intense pain, for it was itself actually being eaten up alive. The ground on which it had been lying was very hard, but there were holes in it that looked as if they were the result of the animal's agonised struggles. The witness asked the defendant if the mare belonged to him, and he replied "Yes," adding that he had not had it killed because "I have heard I shan't get the money it's insured for (£27)." The witness informed defendant he and Inspector Frear were inclined to take the responsibility of destroying the animal, whereupon the defendant replied, "If that is so. I will have her killed." Defendant explained that he turned the mare out on the previous Friday, and on the Saturday morning when he went to look for her he found her down. He sent for a veterinary surgeon, who told him the mare was suffering from paralysis, and would never recover. He gave it hay, but it did not appear to be able to take anything. He had been to see the animal twice daily, and also to see Mr. Rogers, the agent of the Horse Insurance Company, Limited, who advised him that he would not get the insurance money if he slaughtered the animal without the company's permission.—In answer to Mr. Clayton witness stated that the field in which the mare lay was about half a mile from defendant's house.—Inspector Frear, who accompanied the last witness to the field, gave corroborative evidence. He also asked the defendant why he did not have the animal slaughtered, and defendant replied, "Mr. Rogers has ordered me not to."—Fredk. Wilkinson, a blacksmith, deposed to having a view of the field in which the animal lay from his workshop. He saw the mare daily from July 20th to July 23rd, and during the whole of that time observed no one take it any hay or water. On the Tuesday before the Thursday on which the inspectors visited the field he noticed that the flies had struck the mare.—By Mr. Clayton: It was possible for people to have taken the animal food and water without witness observing them.—By the Chairman: He saw on the Tuesday a woman come and waft the flies off the animal. About a handful of hay was on the ground by the mare's head on the Monday, and it remained there three days uneaten.—Police-constable Dye also gave corroborative evidence as to the condition of the mare.—Mr. Coburn, veterinary surgeon, in practice at Eastwood, deposed to seeing the mare, at

defendant's request, on July 18th, and to find it suffering from paralysis. He informed defendant the animal was incurable, and that he had better see Mr. Rogers about it.—By Mr. Clayton: He had acted as veterinary to Mr. Flint for a number of years, and had some months previously attended the mare in question pretty regularly for the same complaint as that from which it suffered eventually. After it had been shot he saw the mare, and noticed that the head was damaged with abrasion on the ground, and there were abrasions on the skin of the foreleg and about the hips. There were maggots on the carcase.—By Mr. Williams: The maggots could not be numbered by millions, but counting in all the small ones by the thousands. The left eye was not destroyed, but swollen over so as to be invisible. The mare must have suffered more or less pain.—Mr. Rogers, agent for the Horse Insurance Company, deposed that he received a communication from the defendant on July 18th, with regard to the mare being down. He wanted to destroy the animal, but witness informed him he did not think the company would accept the statement without a veterinary surgeon's certificate.—By Mr. Clayton: Insured animals could not be destroyed without a veterinary's certificate and the company's consent.—Mr. Clayton here read a clause in the agreement between the defendant and the company, stating that the animal must not be destroyed without the company's written consent. The witness, continuing, stated that defendant's man called on him on the Thursday to ask him to assist in removing the mare. This witness, out of friendship for the defendant, would have done had he not been suffering from a bad leg. Eventually the mare was killed without witness having seen it or without anything having been properly settled with the company.—By Mr. Williams: Witness distinctly told defendant the animal must be well looked after pending the arrival of the permission for its destruction from the company.—Mr. Clayton, in defence, stated that the case was a very painful one to have to defend, more especially when the defendant was a farmer who had lived at the farm in question for a large number of years without any complaint against him. The prosecution had to prove that defendant's knowledge of and conduct towards the animal were such as to cause it unnecessary suffering. The case, he must say, had been exaggerated, and he had no doubt the magistrates would rely upon the evidence of the veterinary surgeon as to the condition of the animal. Had the defendant destroyed the animal without the insurance company's permission he would not have been able to recover a single penny of the insurance money, which was considerable. As it was, defendant thought he was justified in not having the animal immediately slaughtered. He was not the best of scholars, but he seemed to have written to the agent promptly, asking him to see the mare. The animal was found to be paralysed on July 18th, and on the 20th there was a reply from the company, so that he must have written on the 19th. On the only point, which implied actual neglect on defendant's part, the point as to the feeding of the mare, defendant was able to call evidence.—Adam Clarke, a waggoner, in the employ of the defendant, testified to having taken the animal grass and water daily from July 18th to the 23rd, when it was on the ground. He did this on the instructions of the defendant.—Mary Wilson, a domestic servant, gave similar evidence.—After the magistrates had consulted in private, the Chairman stated that though they could not congratulate the defendant upon his conduct in the case, yet the responsibility for the pain the animal must have suffered rested in a great measure with the insurance company. Defendant appeared to have acted on the advice of the veterinary surgeon and the agent, and it was rather difficult for him, under the circumstances of the insurance, to have acted in other way. The insurance company, instead of writing letters and causing delay, should at least have taken some precaution to prevent suffering to the animal. The Bench, though they

thought the company or its agents were to blame in the matter, disapproved of defendant's conduct, but, under the circumstances, had decided to dismiss the case.—*Sheffield Independent*, August 17th, 1896.

WHEN VETERINARY SURGEONS DISAGREE. — John Dovey, a market gardener, of Wellow, was summoned for illtreating a horse by working it in an unfit state on July 21st, and Charles Dovey, the father, with causing the animal to be so worked.—Police-constable Baker deposed to stopping the animal on account of its going so lame. On examining it he found the fetlock joint very much swollen and inflamed, and the horse was evidently in pain.—Inspector Lucas, R.S.P.C.A., stated that some tendons were sprained, which caused the swollen fetlock joint. Mr. Gould, veterinary surgeon, corroborated his testimony, and added that the horse was quite unfit to be worked. —The defendant called Mr. Burden, veterinary surgeon, who stated that there was a slight sprain of a tendon, but he considered that the animal was fit to work both on road and land.—The Bench held that the horse was worked whilst in an unfit state, and imposed a fine of 5s. and costs.—*Southampton Times*, August 15th, 1896.

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# Army Veterinary Department.

*Retired Pay.—Army Veterinary Department.*

VICTORIA R.I. A.O. 145. *August*, 1896.

WHEREAS it has been represented to us that the rates of retired pay hitherto granted to officers of our Army Veterinary Department are insufficient;

OUR WILL AND PLEASURE IS that the following shall be substituted for Articles 585 and 588 of our Warrant for the pay, appointment, promotion, and retired pay of our army, dated the 11th March, 1896:

585. SCALE OF RETIRED PAY.

*Officers under the rank of Director-General retiring under Article* 583.

*Voluntary Retirement.*

| | |
|---|---|
| Veterinary-Lieutenant-Colonel— | |
| After 20 years' service .. .. .. .. | £250 a year. |
| „ 25 „ .. .. .. .. | 350 „ |
| „ 30 „ .. .. .. .. | 420 „ |
| Veterinary-Major or Veterinary Captain— | |
| After 20 years' service* .. .. .. .. | 200 „ |
| „ 25 „ .. .. .. .. | 300 „ |
| Officers retiring under Article 584— | |
| A gratuity of £800. | |

588. SCALE OF RETIRED PAY.

*Officers retiring under Article* 586.

Director-General, Army Veterinary Department .. .. £600 a year.

*Retirement for Age or Medical Unfitness.*

| | |
|---|---|
| Veterinary-Lieutenant-Colonel— | |
| After 20 years' service* .. .. .. .. | 320 „ |
| „ 25 „ .. .. .. .. | 400 „ |
| „ 30 „ .. .. .. .. | 420 „ |
| Veterinary-Major or Veterinary-Captain— | |
| After 10 years' service .. .. .. .. | 8s. 6d. a day. |
| „ 15 „ .. .. .. .. | 10s. 6d. „ |
| „ 20 „ .. .. .. .. | £250 a year. |
| „ 25 „ .. .. .. .. | 350 „ |

*Officers retiring under Article* 587.

After 10 years' service.—A gratuity of £800.

After 30 years' service.*—Retired pay at the rate fixed by Article 585 for the officer's rank when retiring voluntarily after 30 years' service.

IT IS OUR FURTHER WILL AND PLEASURE that this our Warrant shall take effect from the 1st day of January, 1896.

Given at our Court at Windsor, this 6th day of July, 1896, in the 60th year of our reign.

By Her Majesty's command,

LANSDOWNE.

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Veterinary-Lieutenant-Colonel R. Poyser was presented with the Distinguished Service Order on the 23rd inst., at Murree, India, by Major-General Moorsom, in the presence of the staff officers of the headquarters of the Punjab Army and Rawul Pindi district.

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Veterinary-Captain D. J. Barry proceeded to Aldershot from Preston on 25th inst., with 6th Dragoons.

Veterinary-Captain R. Moore and Veterinary-Lieutenant W. M. Millar accompanied 9th Lancers from Aldershot to the Royal Albert Docks on 26th inst., for embarkation to South Africa in s.s. "Malta" and "Simla."

Extract from *London Gazette*, dated 25th August, 1896:—"Army Veterinary Department—Veterinary-Captain J. D. Edwards, 1st Life Guards, to be Veterinary-Major. Dated, 26th August, 1896."

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# Extracts from Foreign Journals.

## LINGUAL ACTINOMYCOSIS IN A COW.

DR. V. BONARETTI, in the *Clinica Veterinaria*, records an interesting case of recovery of this affection by the iodide of potassium treatment. Affected for some time, and treated for simple glossitis first, the condition of the tongue was such when seen by Bonaretti that the administration of a drench containing 10 grammes of the iodide in a quart of water could not be administered. Deglutition was impossible, and the animal threatened to fall at each attempt made. It was then decided to try administration by the rectum. After taking rectal injections of iodide of potassium for three days in succession, the improvement of the tongue was such that it became possible to continue the treatment, which was done. Recovery was complete by the administration of five doses of the iodide, 10 grammes to each dose.

## ENCOURAGEMENT TO VETERINARY SURGEONS ABROAD. A HINT TO OUR UNIVERSITIES.

The Royal College of Medicine and Surgery in Barcelona has announced a competition in four subjects, with prizes to the successful competitors. One of these is of interest to veterinary surgeons. It is entitled, "Comparative Study, Experimental and Clinical, of Small-pox in the Human Subject and in

the Domestic Animals." Candidates will discuss the question of the unity or plurality of the disease or diseases, and the relations between it or them and vaccine affections (cow-pox and horse-pox). The first prize is £120 sterling, and the second £40. In addition to the money, the prize-men will receive the title of Academic Correspondent. The papers must be clearly and distinctly written. They may be written in Spanish, French, or Italian, and they must reach the College on or before 30th September next. (*Il Nuovo Ercolani*).

## EMPIRICS IN AUSTRIA.

At a session of the Austrian Landtag, December 18th, 1895, in discussing a proposition of the Minister of the Interior, representative Dr. Ebenbroch spoke of the great need of veterinary surgeons in the country districts, and opposed the report of the Committee on Veterinary Epidemics, which recommended the education of veterinarians, who should first pass through an intermediate school and then study four years at a veterinary high school. He asserted that the agricultural conditions need cheap, practical veterinarians who are thoroughly conversant with the conditions in the country. Whether they are masters of the theories and the medical classics is a matter of indifference. The admission of the blacksmiths who had been employed in the army to veterinary practice was to be especially recommended. As to the agreement with Germany in regard to epidemics, he maintained that the division of Austria into two epidemic districts should have been made long ago. He then made a complaint about the laws respecting epidemics, which, he maintained, had been enforced with too great severity. Freiherr von Erb, representative of the government, remarked, in regard to the need of veterinarians, that the abuse of the laws prescribing the punishment of empirics had ceased, that a certain group of veterinarians who stand between those with a diploma and the empirics are useful to a certain extent. The ministry had already made the suggestion that the elements of veterinary medicine should be taught in all the agricultural schools. But to make such half-educated people the equals of veterinary surgeons with diplomas was impossible. The use of severe measures in carrying out the epidemic laws had not been necessary in Austria in recent years. Severe quarantine regulations in Salzburg had been necessary, because the presence of epidemics there had several times been kept secret.

## POISONING OF A HORSE BY BINIODIDE OF MERCURY.

The same writer says:—"Tie up carefully the heads of horses that have been treated with mercurial preparations if you don't wish to see grave symptoms of poisoning supervene. Some time ago the coachman of a doctor in Paris called me up in the middle of the night, and asked me to come and see one of his horses, which seemed to be dying. When I arrived I found the horse, which had been turned in his stall, tied up by a rein to each of the pillars. His four limbs were close together, his back was arched, his eyes staring, and he was trembling violently all over; the lower extremity of his head was swollen, as was also his tongue; a line of saliva was escaping from the commissure of the lips, and the skin of the lips and nose was covered with a red ointment, the same as was spread over the back tendon of the fore-leg. Then I learnt that a *confrère* had, in the course of the evening, rubbed with an ointment containing biniodide of mercury the fore-legs of the animal for tendinous synovitis. The horse, not having been tied up short in his stall, had been able to reach with his nose, his lips, and his tongue the parts smeared with the ointment. In plain truth, he had pretty well poisoned himself, but with the help of milk, albuminous water, sulphate of iron, and astringent gargles, I was able to bring him round again."

# Reviews.

## Germs in the Dairy: their Uses, Dangers and Control.

The above is the title of a valuable contribution in the last quarterly *Journal of the Royal Agricultural Society of England*, by Dr. Francis T. Bond, Worcester, on the discoveries made during the last few years in the bacteriology of milk, and in the practical application of the knowledge thus obtained.

The author, in crediting the scientists of Denmark with the initiation of the application of science to the manufactures of butter and cheese, refers to the French, German, and American experimenters, and the few in this country who have advanced our knowledge of dairy bacteriology, and summarises the results of their various investigations in the following propositions:—

### *General Results of Investigations.*

The results may be conveniently summarised in the following propositions:—

1. That the changes which milk undergoes from the moment that it leaves the udder of the cow are very complex in their character, and entirely dependent on the influences to which it may be subsequently exposed.

2. That unless the milk be contaminated before it leaves the udder itself by the specific microbes of tubercle, or actinomycosis, there is every reason to believe that it is then entirely free from any germs which would produce immediate change in it, and that if received into perfectly sterilised vessels it may be kept for a considerable length of time without deterioration.

3. That, apart from the possibilities of intra-mammary infection just referred to, the deterioration of the milk commences at the moment it leaves the teat, partly by exposure to filth particles of all kinds, which are floating in the air, especially in the case of cows milked in the stall, and partly from impurities derived from the teat itself and from the hands of the milker.

4. That, broadly speaking, the germs derived from these various sources may be divided into two categories—(*a*) Those which tend to produce souring and eventually to cause coagulation of the casein of the milk into curd, and (*b*) those which have an opposite effect, viz., to render the milk alkaline, next to coagulate the casein, and then to dissolve up the curd so formed, by a process which is known as peptonisation, from its analogy to similar changes which are effected under the influence of the intestinal juices in the alimentary canal of the mammalia. Where the milk does not sour, but where curd is formed in it, the process of peptonisation thus initiated goes on with great rapidity, and soon passes into putrefaction.

5. That whilst the acidifying germs are mainly derived from the atmosphere, in which they are universally and largely diffused, the peptonising and putrefactive germs are absorbed from filth of various kinds, largely excremental in its character, which finds its way either into the milk from the sources above mentioned, or from exposure to a filth-laden or infected atmosphere after milking, or from storage in polluted vessels.

6. That by exposing milk thus contaminated to an appropriate temperature, the whole of these decomposing germs can be destroyed and the milk rendered as pure as, and in some cases even purer than, it came from the udder of the cow; for, not only are the ordinary acidifying and putrefactive germs thereby destroyed, but also those of specific infections, such as that of tubercle, and of infections allied to, if not identical with, those of scarlet fever and diphtheria, and possibly of other infectious diseases, which there is good reason to believe are derived from affections of the cow's teat.

7. That milk thus artificially purified or sterilised is not merely deprived

of ingredients which cause its rapid deterioration and render it more or less unfit for food, but if placed when in this condition in vessels in which it can be preserved air-tight, it may be kept for a considerable period without any serious change, and is thus "protected" against injurious influence until it is required for consumption.

8. That, apart from this advantage which "protected" milk offers as an article of food, the destruction of germ life in it by the method indicated materially improves it for dairy purposes, by removing from it ingredients which are full of trouble to the makers of butter and cheese, to say nothing of greatly facilitating the ordinary handling of so perishable an article by those who supply it for human consumption. Milk thus freed from the mass of prejudicial germs with which it is ordinarily infected lends itself with ease to the reception of those special germs which are essential to the production of high-class butter and cheese, in regard to the uniformity of quality, delicacy of flavour, and keeping properties. In the case of butter especially, there is ample evidence that an article made on these lines is so unquestionably superior to one produced in the empirical and haphazard way hitherto alone available, that the maker who will manufacture his butter on these lines will be as sure of commanding the market for it as the man who in any other industry produces a first class and uniform article is sure of driving out of it an inferior product. What applies to butter applies in an equal degree to cheese, in the manufacture of which there is more scope for intelligence and more room for profit in producing a high class article than there is in the case of butter.

In ordinary circumstances the whole of the vast mass of minute life with which milk and cream swarm is derived from sources extraneous to the cow. But there is one exception which is of so much importance, both from a sanitary and a dairy point of view, as to require some notice here. That exception is the tubercle germ. This germ, as is now generally known, is the exciting cause of that great group of diseases which, under the popular name of "consumption," have from time immemorial been the bane not only of the human race, but of some of the lower animals, notably of the monkey, and also, but to a much less extent, of the bovine race. Of the prevalence of this disease amongst cattle, especially those which lead a stalled life, there is no doubt, but as to the extent to which it prevails there is some difference of opinion.* Fortunately, so for as milk is concerned, there appears from the evidence† submitted to the Royal Commission on Tuberculosis there is no danger of infection except where the udder itself is distinctly affected, and in this case it is not difficult to recognise the existence of the malady by the touch and, still better, by the reaction established in the animal by the injection of tuberculin. Unfortunately, however, we have at present no guarantee against the introduction of tuberculous milk into the market, and as, according to Dr. Sydney Martin, such milk possesses a high degree of virulence, and a very minute quantity of it may infect a much larger bulk into which it may be introduced, we are evidently in face of a real danger, the true potency of which it is not easy to estimate. Apart from the risk thus involved, especially to children, from the consumption of milk so infected, there seems to be some evidence that it is directly prejudicial for dairy purposes, Dr. Martin stating that the

* Professor Bang, of Copenhagen, states that in some cow-houses he has found as many as 80 per cent. of the cattle tuberculous; but it must be remembered that the practice of continued stall feeding which prevails in Denmark throughout the year is especially favourable to the development of this disease. Stutzer gives the percentage of tuberculous cattle in the slaughter-houses of East Prussia at 20 to 26, whilst in Berlin in 1890 it was not higher than 11. Overcrowding of cattle in cow-houses is as fertile a source of tuberculosis as is overcrowding of human beings.

† Journal R.A.S.E., 3rd series, vol. vi., 1895, p. 400.

butter, butter-milk, and skim-milk obtained from this class of milk is "very defective." It is satisfactory to know that exposure of tuberculous milk to a temperature of 185° F. (85° C.) for five minutes* is sufficient to render it innocuous, and we have, therefore, in this fact the indication of the need for thus treating all milk intended for consumption, at any rate by young persons, in whom the susceptibility to the affection is particularly keen.

Assuming that we can exclude, as we certainly might do, by a proper system of veterinary inspection, all risk of infection of milk by tubercle, it is obvious that if we could secure the extraction of the milk from the udder by any process which would enable us to protect it from the primary risks of infection to which it is exposed in the act of milking, we should start with a fluid which would be practically germ-free. Is it possible to do this? So far as concerns cows which are milked in the pastures, as is the case with a large proportion of our own herds during the summer months, the risk of inoculation of prejudicial germs is almost entirely dependent on the cleanliness which is observed by the milker in regard to his hands, his vessels, and the teats of the cow. With reasonable care in these respects, milk so obtained exhibits a low infusion of germ life, and possesses a relatively high keeping power, especially if it has been cooled as soon as possible after milking under proper conditions. Unfortunately, the conditions under which refrigeration is generally carried on are such as to give an effective start to the infection of the milk. Instead of being cooled in bulk, in vessels conveniently designed for effecting this object, and in which the milk would be protected from exposure to the air, the common practice is to run it in a thin film over a corrugated vessel, kept cool by the flow of water through it, but generally standing in close proximity to a farm-yard or a scullery, or some other place, the atmosphere of which is laden with germs of all kinds, with which the milk is at once seeded.

### *Sources of Dangerous Germs.*

But it is in the milk of the stall-fed cow that the inoculation of infectious germs takes place most abundantly, and that the seeds of future mischief, especially for dairy purposes, are mainly sown. This fact is well illustrated by the number of bacteria present in winter milk, as compared with that obtained from cows pastured in the fields. And it is the germs which are received by the milk at this stage of its existence which are the most prejudicial to its future employment, either for direct consumption or for conversion in the dairy. It is here that its impregnation with the *Bacillus coli*, the ordinary stercoraceous germ of the large intestine of all the higher animals, takes place. This is the germ which is so closely allied to the special bacillus of typhoid fever, with which it has probably been frequently confused. Of its prejudicial effects on milk as a food, quite apart from all sentimental considerations, there can be no doubt, especially in the case of infants, in whom it is a fertile source of chronic diarrhœa. Whether under favourable conditions, such as cultivation in so highly nutrient a medium as milk would suggest, it ever undergoes evolution into the more specialised type of the allied typhoid bacillus, is a question which must be considered as at present undetermined, though it is by no means improbable.

Nor is the effect of this bacillus less prejudicial to milk that is intended to be converted in the dairy into cream, butter, or cheese. It belongs to that class of germs, the *sapophytic*, the effect of which upon milk is to attack simultaneously both the milk sugar and the casein, setting up in the former the butyric fermentation, accompanied by copious evolution of gases (chiefly hydrogen and carbohydrides), and producing coagulation of the casein, with

* By heating tuberculous milk for a longer period it may be sterilised at a much lower temperature, *e.g.*, for one hour at 146° F. (60° C.).

subsequent peptonisation. It is probably this bacterium which is largely responsible for the trouble which is so familiar to the cheesemonger in the production of "huffy" or "puffy" cheese. It thrives in a neutral or alkaline medium, and when it has once established an ascendency in milk, the ordinary souring bacteria, the presence of which is so essential to the ripening of cream and to the early stages of the manufacture of cheese, are either unable to propagate in it or are gradually extinguished in the struggle for existence which ensues. It is, therefore, as much to the interest of the dairy operator as to that of the public generally, on sanitary grounds, that milk should be protected from this noxious pest. The difference in value between a milk which has been copiously seeded with it and one which is practically free from it can hardly be over-estimated, either in the loss of infant human life on the one hand, or in the extensive deterioration of dairy produce which it causes on the other.

The author proceeds to detail the Pasteurising process in cheese and butter making, also to advocate the use of artificial milkers, with the view of minimising the risk of infection from the human milker by the neglect of cleanliness. An interesting summary of the "Researches on the Bacteria of Milk" is also given, to quote which we regret the space at our disposal will not permit.

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# Correspondence.

BOMBAY VETERINARY COLLEGE, PAREL,
*20th July*, 1896.

DEAR PROFESSOR WILLIAMS,—Only one out of the fourteen horses which the officers of the 24th Baluchistan Regiment took with them to Mombassa has returned to India, the others having succumbed to the mysterious disease which seems to be so fatal to all animal life in Mombassa.

I can find out little or nothing regarding the disease here, and shall be glad if you can give me any information regarding it.—I am, yours sincerely,

JAS. MILLS.

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## THE LINCOLNSHIRE LAMB DISEASE.

*To the Editor of* THE VETERINARY JOURNAL.

*August 24th*, 1896.

DEAR SIR,—I have been reading lately, in the weekly paper *Farm and Home*, accounts of a mysterious disease among lambs in Lincolnshire, which has caused great losses, amounting to 33 per cent., in flocks among which the disease appeared. So serious has the situation been for the unfortunate flockmasters, that they have held public meetings, have called in the aid of the Board of Agriculture, the London Veterinary College, and, finally, that of Professor Brown, C.B., to discover the nature of this ruinous disease, and the requisite preventives and remedies. In the *Farm and Home* of 22nd August, a summary of the proceedings at a conference held at Brigg, Lincolnshire, is given, which informs us that Mr. Tindall, Lord Yarborough's agent, described the steps taken during the past few weeks to discover the nature of the disease and detailed the experiments and conclusions of Professor Brown. Now, Sir, I have been so struck by the similarity of the details, even to the medical treatment recommended, in Professor Brown's report, with the description of a disease in sheep, termed Parasitic Gastric Catarrh, which I find in my text book, Williams' "Principles and Practice of Veterinary Medicine," that as a simple student, still, not forgetful that fools rush in where angels fear to tread, I am bold enough to hazard the opinion that had this text book been

referred to for guidance, much loss and trouble would have been saved. My reasons for that opinion are best given, thus :—

WILLIAMS, 1884.

The autumn of 1883, in Selkirkshire, was very wet, the grass becoming rank and the soil damp. The lambs did not thrive. In February, 1884, disease became more intense with, among other symptoms, a hacking cough, rapid waste of flesh, distension of abdomen, and œdema of the head. Result, great mortality.

Conclusions, following *post-mortem* examinations. — The appearance of disease early in the autumn, due to the *strongylus filaria* in the lungs. In the winter and spring, to the presence of the *strongylus contortus* in the 4th stomach, and found in great numbers, the filaria in the lungs being comparatively few or none.

Treatment prescribed, that recommended by Continental authorities.

Rabe used picrate of potash in the small dose of 0·12 grms., or about 2 grains per day for three days, and was successful in his treatment. The picrate of potash was given in thick linseed mucilage.

Zurn advises the administration of five grains of picrate of potash for a lamb, and 20 grains for a sheep, daily.

The feeding.—Good food is recommended, *e.g.*, roasted malt, seeds, lupine hay or lupine seeds, and the following medicines—

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| Chabert's oil.. | .. 1 part |
| Oil of turpentine | .. 3 parts |

the dose being one teaspoonful per day.

Preventive measures.—To dig up grasses suspected of harbouring parasitic ova, also a liberal application of salt to the land, and also an allowance of it to the sheep.

BROWN, 1896.

The disease that killed so many lambs in the autumn of 1895, it was believed, was due to pneumonia, induced by debility from severe weather at the end of September and the beginning of October, but was not prepared to give a definite opinion. *The Board of Agriculture officially pronounced the disease to be parasitic, due in great measure to climatic influences.*

In the spring of 1896 ten lambs were sent to Professor Brown. He and his assistants believed these worms to be of two kinds, one being in the 4th stomach, and the other, although it had not actually appeared, attacking the lungs. Treatment prescribed follows in his own words :—"The treatment which I have tried for the last two or three weeks has been very successful. Two lambs, of the seven which remained, were killed on Saturday, and of the thousands of worms which were present in the fourth stomach I could only find two or three alive." "The medicine (No. 2) might be given to all lambs for a week as directed, and afterwards only to the worst cases; but it must be prepared and its action watched by a professional man." "The formula (No. 2) must be made up by a veterinary-surgeon, and stock-owners must not run the risk of such a compound without veterinary aid in such a serious malady."

A feeding mixture also prescribed.

Preventive measures, none reported.

I think, Sir, I am fully warranted by the above comparison of this disease, as described by Principal Williams in 1884, and the disease that Professor Brown was called in to discover in 1896, in assuming that they are one and the same. But still more remarkable is it to observe that the remedy recommended by both possesses dangerous properties. I would like to know if this disease, lately discovered by Professor Brown, has a remedy in the same medicinal agent, as prescribed for the like disease, amply and clearly described in the Principles and Practice of Veterinary Medicine, by Principal Williams, or have I solved the mystery?

I enclose my card, and remain, etc.,

INQUIRER.

# Notes and News.

DISINFECTION: REAL AND ILLUSORY.—Dr. E. F. Willoughby, in a paper on "Disinfection: Real and Illusory," says:—Tracing the idea of disinfection from the religious rites of the ancients through the more recent use of deodorants for the purpose of masking foul smells, he stated that the real value of any disinfectant was to be measured by its power of killing the bacteria of disease under actual and practical conditions. Aërial disinfection in the presence of a patient was impossible, and, after his removal superfluous, for what was wanted was renewal, not purification of the old air. Enumerating the various classes of disinfectants, he showed that most were too feeble to be of any use, others too destructive of fabrics, some too limited in their action, as carbolic acid, which had no effect on some bacilli, including that of typhoid, and others again which actually favoured their growth. The disinfection of rooms even by sanitary authorities was for the most part illusory, the degree of success achieved being due to the soap and water rather than to the sulphurous fumes, which could not gain access to chinks and the interior of furniture. There were but three wholly trustworthy—corrosive sublimate, limewash, and heat. Every part of the walls, floors, &c., that could not be washed with fresh-burnt lime, should be sprayed or mopped with a solution of sublimate, 1 in 1,000, and when dry with soap and water. All linen that could be boiled should be plunged for 10 to 20 minutes in boiling water, and all bedding, &c., sent to a disinfecting oven. Dry heat penetrated very slowly and was destructive, but with steam under slight pressure we had it in our power to raise the interior of a mattrass to the temperature of boiling water within half an hour and without damage. In the hands of Mr. Reck, of Copenhagen, the steam disinfector had quite recently undergone great improvements and simplification, so that he could now provide an apparatus suited to the needs of a public institution or a town of all but the largest size for about a quarter of the cost of the older patterns.

KANSAS.—The suit of the cattlemen against the Missouri, Kansas, and Texas Railroad Company, and shippers over the same, for shipping cattle into the grazing country and spreading Texas fever among their stock, has been decided at Topeka, and the cattlemen awarded 50,000 dols. damages. This decision is by the Supreme Court, and sustains that of the lower court.

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# Obituary.

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| Thos. H. Simcocks, New Quay, Drogheda (Fel. July, 1886) | April, 1871. |
| John McLaren, Beverley, Yorks .. .. .. .. | April, 1886. |
| Henry Ford, Leamington .. .. .. .. .. | April, 1866. |
| Henry King, Melbourne, Derbyshire .. .. .. | May, 1845. |
| Jos. Coe, Stoke-on-Trent, Staffs .. .. .. .. | May, 1860. |
| R. Wilson Sloane, Ormskirk, Lancs. .. .. .. | April, 1865. |
| Andrew Balfour, Kirkcaldy, Fifeshire .. .. .. | April. 1844. |

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## Communications, Books, Journals, etc., Received.

Recueil de Médecine Vétérinaire (Alfort); La Presse Vétérinaire (Paris); L'Echo Vétérinaire (Liége); Annales de Médecine Vétériniare (Brussels); Berliner Thierärztliche Wochenschrift (Berlin): La Clinica Veterinaria Milan); Il Nuovo Ercolani Pisa); La Revista Veterinaria (Buenos Aires), La Gaceta Médica de Costa Rica; The Veterinary Magazine, etc., etc.